



JUNE 2016

# Carlsbad Watershed Management Area Water Quality Improvement Plan

Prepared for:

- City of Carlsbad
- City of Encinitas
- City of Escondido
- City of Oceanside
- City of San Marcos
- City of Solana Beach
- City of Vista
- County of San Diego

Prepared by:



In conjunction with:

- AMEC
- ESA
- Paradigm Environmental
- Tetra-Tech
- Katz & Associates







June 29, 2016

**CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN  
PROVISION B SUBMITTAL, STATEMENT OF CERTIFICATION**

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A handwritten signature in blue ink that reads "Patrick A. Thomas".

Patrick A. Thomas  
Public Works Director

A handwritten date in blue ink that reads "6/29/2016".

Date



*City of  
Encinitas*

June 30, 2016

**CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN PROVISION B  
SUBMITTAL, STATEMENT OF CERTIFICATION**

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Glenn Pruim  
Director of Public Works

6/20/16


Date



June 28, 2016

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\_\_\_\_\_  
Christopher W. McKinney  
Director of Utilities  
City of Escondido

\_\_\_\_\_  
June 28, 2016



# CITY OF OCEANSIDE

## WATER UTILITIES DEPARTMENT

June 23, 2016

### **CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN PROVISION B SUBMITTAL, STATEMENT OF CERTIFICATION**

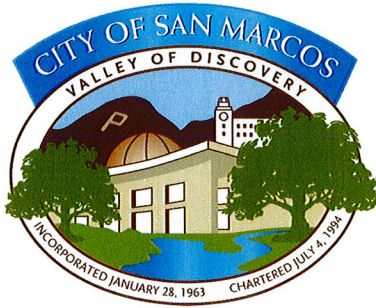
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M.A. Lahasaiezadeh

Mo Lahasaiezadeh, PH.D., REHS  
Environmental Officer  
City of Oceanside

June 23, 2016

Date



June 28, 2016

**CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN  
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\_\_\_\_\_  
Matthew Little  
Development Services Director

6/28/16  
\_\_\_\_\_  
Date





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## CITY OF SOLANA BEACH

[www.cityofsolanabeach.org](http://www.cityofsolanabeach.org)

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June 29, 2016

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Mohammad Sammak  
City of Solana Beach  
City Engineer / Public Works Director

6/23/16  
Date



June 24, 2016

**CARLSBAD WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN  
PROVISION B SUBMITTAL, STATEMENT OF CERTIFICATION**

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\_\_\_\_\_  
Greg Mayer  
City Engineer

\_\_\_\_\_  
June 24, 2016




## County of San Diego

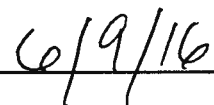
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\_\_\_\_\_  
SARAH E. AGHASSI  
Deputy Chief Administrative Officer

  
\_\_\_\_\_  
Date



# **Carlsbad Watershed Management Area Water Quality Improvement Plan**

**San Diego Regional Water Quality Control Board  
Order R9-2013-0001**

**June 30, 2016**

**Prepared and Submitted by the  
Carlsbad Watershed Management Area Responsible Agencies**

**City of Carlsbad  
City of Encinitas  
City of Escondido  
City of Oceanside**

**City of San Marcos  
City of Solana Beach  
City of Vista  
County of San Diego**

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Appendix E - Offsite Alternative Compliance Candidate Projects List

Appendix F - Hydromodification Exemption Analyses for Select Carlsbad Watersheds

## List of Acronyms and Abbreviations

303(d)	Clean Water Act Section 303(d) list of impaired waters
AGR	Agricultural Supply
ASBS	Area of Special Biological Significance
Basin Plan	Water Quality Control Plan for the San Diego Basin
BIOL	Biological Habitats of Special Significance
BMP	Best Management Practice
Caltrans	California Department of Transportation
COD	Chemical Oxygen Demand
CWA	Clean Water Act
HA	Hydrologic Area
HPWQCs	Highest Priority Water Quality Conditions
HSA	Hydrologic Sub-Area
IBI	Index of Biological Integrity
JRMP	Jurisdictional Runoff Management Program
JURMP	Jurisdictional Urban Runoff Management Program/Plan
LTEA	Long-Term Effectiveness Assessment
MAR	Marine Habitat
MEP	Maximum Extent Practicable
MLOE	Multiple Lines of Evidence
MS4	Municipal Separate Storm Sewer System
MUN	Municipal and Domestic Supply
NNE	Nutrient Numeric Endpoint
O/E	Observed-to-Expected ratio
PWQC	Priority Water Quality Condition
REC-1	Recreation Contact Water
RWQCB	San Diego Regional Water Quality Control Board
SHELL	Shellfish Harvesting
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WARM	Warm Freshwater Habitat
WMA	Watershed Management Area
WQICP	Water Quality Improvement Consultation Panel
WQIP	Water Quality Improvement Plan
WURMP	Watershed Urban Runoff Management Program

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## Carlsbad WMA Water Quality Improvement Plan

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## Executive Summary

The Carlsbad Watershed Management Area (WMA) Water Quality Improvement Plan (WQIP) was prepared by the Cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, Vista, and the County of San Diego to help guide the Responsible Agencies' (RAs) Jurisdictional Runoff Management Programs (JRMPs) towards achieving improved water quality in Municipal Separate Storm Sewer Systems (MS4) discharges and other receiving waters. As a result, one of the most important goals of the WQIP is to assist the RAs in establishing and implementing priorities, goals and strategies for their individual JRMPs to make improvements to the overall water quality within the WMA. This establishes the WQIP as the overarching plan that each RA will use to develop and implement their jurisdictional programs. RAs' JRMPs contain the strategies, standards and protocols by which each RA will implement their individual program in response to the priorities and goals established within the WQIP. Through the WQIP, the RAs are looking to foster the interconnectivity to improve the overall water quality in their receiving water bodies.

## Regulatory Context

In May 2013, the San Diego Regional Water Quality Control Board (RWQCB) adopted Order R9-2013-0001 – National Pollutant Discharge Elimination System Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4) Draining the Watersheds within the San Diego region. The Permit requires that owners of storm drain systems, municipal agencies or RAs implement management programs, to limit discharges of non-storm water runoff, and pollutants<sup>1</sup> from the storm drain systems. Concurrently, the Permit requires RAs in each of the region's watersheds to develop WQIPs. The Carlsbad WMA WQIP was developed in response to the 2013 Permit's requirements.

The 2013 Permit is primarily focused on watershed-based program planning and program outcomes, thereby allowing each jurisdiction the power to focus their own resources to "effectively prohibit non-storm water discharges to its MS4, reduce pollutants in storm water discharges from its MS4...and achieve the interim and final numeric goals..." Furthermore, the Permit also states that, "where appropriate, Watershed Management Areas may be separated into sub watersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water" This approach represents a paradigm shift from previous Permits that led jurisdictions to essentially implement the same activities at the same frequencies (throughout their jurisdictions), with little to no regard for prioritizing water quality conditions and sources of pollutants that occurred within their jurisdictions.

The Permit places a greater emphasis on adaptive management, whereby information from program implementation and monitoring will be used to adapt the WQIP, so that it becomes more effective in achieving water quality improvements. This employs a five-year cycle of adaptive management that includes planning, implementation and assessment phases that rely upon one another for information to improve the plan's efficiency and overall effectiveness.

## Location

The Carlsbad WMA covers approximately 211 square miles in area and is formed by a group of six (6) individual watersheds in northern San Diego County. The RAs within the Carlsbad Watershed Management Area include the following eight (8) agencies:

- City of Carlsbad
- City of Encinitas
- City of Escondido
- City of Oceanside
- City of San Marcos
- City of Solana Beach
- City of Vista
- County of San Diego

---

<sup>1</sup>The use herein of the terms "pollutant(s)" and "pollution" should not be construed as an admission by the Responsible Agencies that the substances referenced herein constitute "pollutants" as that term is used in the context of liability insurance "pollution" exclusions as construed by California insurance law.

Figure ES-1 shows the six (6) major watersheds that make up the Carlsbad WMA. Each watershed or hydrologic area (HA) has specific characteristics that distinguish it from the others including draining to separate receiving water bodies. While all of the HAs form part of the Carlsbad WMA, they are all hydrologically disconnected with distinct creek systems that drain to separate watershed outlets. For ease of prioritization, goal setting and resulting program implementation, discussions are separated by HAs in this WQIP. The HAs are as follows: Loma Alta, Buena Vista Creek, Agua Hedionda, Encinas, San Marcos Creek, and Escondido Creek.

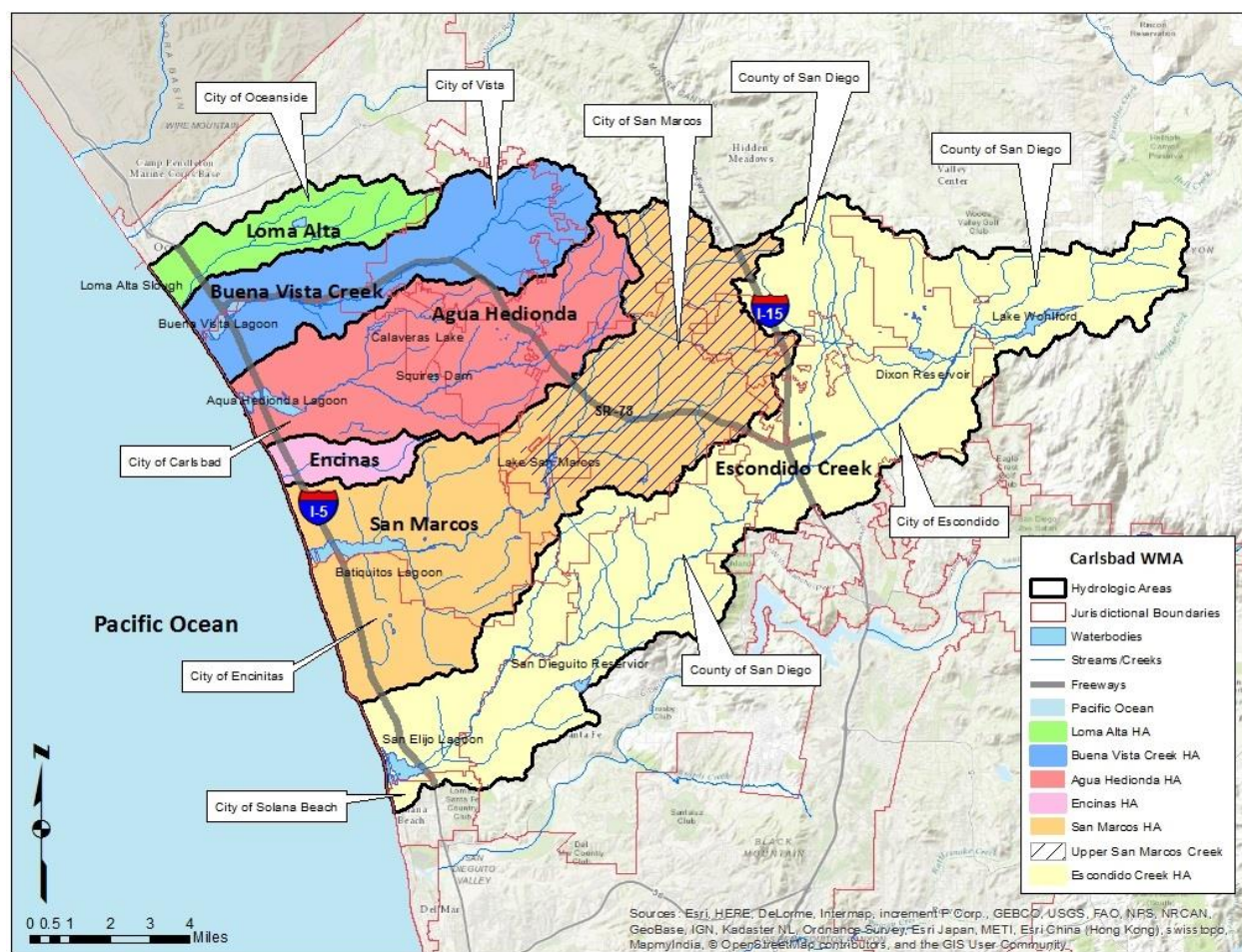


Figure ES-1: Carlsbad Watershed Management Area

## WQIP Development Process

The WQIP was developed over a two-year period after the MS4 Permit was adopted in May 2013. The development process set phased benchmarks for the development and submittal of the components of the WQIP. Phase 1 focused on the priority water quality conditions and identification of highest priority water quality conditions (HPWQCs). Phase 2 focused on the identification of water quality numeric goals and schedules for achieving the goals, as well as selection of water quality improvement strategies to address the sources of pollutants contributing to the Highest and Priority Water Quality Conditions (PWQCs). Phase 3 of the process included the development of the monitoring and assessment program – both of which are integral to the WQIP iterative process.

During the two-year development process, the public participation process became a critical component. The WQIP process relied heavily on an active public participation (more than in previous MS4 Permit-related water quality planning processes); the process included these four primary components:

- Public Input in Response to Calls for Data

- Public Workshops
- Water Quality Improvement Consultation Panel, and
- RWQCB Public Comment Periods.

The RAs also held two public workshops to inform the public of the WQIP process and solicit input for water quality conditions; sources contributing to water quality conditions; strategies to address the sources; numeric goals and associated schedules. As a result of the solicitations, the general public provided a variety of data and information for consideration in the planning process.

The RAs selected a Water Quality Improvement Consultation Panel (WQICP) from interested candidates; the intent of which was to provide a ‘sounding board’ for the developed plan elements. Serving on the WQICP required familiarity with the MS4 permit, water quality issues, and a familiarity with the vast and diverse Carlsbad WMA. The WQICP members include:

**Table ES-1: Carlsbad WMA Water Quality Improvement Consultation Panel**

Name	Representing	Status
Ms. Laurie Walsh	RWQCB	Primary
Mr. Eric Becker	RWQCB	Alternate
Mr. Gregory McBain	Environmental Community	Primary
Mr. Brad Roth (replaced Mr. Doug Gibson)	Environmental Community	Alternate
Mr. Steve Gruber	Development Community	Primary
Mr. Tory Walker	Development Community	Alternate

The WQIP will be implemented through the effective period of the 2013 Permit – anticipated to be sometime in mid-2018. The RWQCB has indicated that the next permit to be adopted in 2018 will be substantially the same as the current permit. The intention of the RWQCB is to allow the long-term process of the WQIP implementation to mature rather than redirecting the RAs’ programs after only several years of implementation – another significant change from previous permitting processes.

The steps taken in developing the WQIP included identifying:

- Prioritized water quality conditions, where sufficient data is available for each HA within the Carlsbad WMA. From this list of prioritized water quality conditions, the HPWQCs for each HA were identified.
- Those sources that are most likely to contribute (having the greatest threat to water quality) to the HPWQC for each identified condition.
- A list of potential water quality improvement strategies that RAs can select for implementation, either jurisdictionally or in cooperation with other RAs or entities, with the goal of improving water quality.
- Areas of focus where numeric goals will be established and strategies implemented to improve water quality.
- Numeric goals and schedules for improvements to water quality and water quality conditions.
- Water quality improvement strategies and schedules for implementation. The identified strategies represent the activities the RAs will implement in order to make water quality improvements that will have positive impacts on the identified highest and priority water quality conditions.

## Major Components of the WQIP

The Carlsbad WMA WQIP includes several major components: water quality conditions, goals and schedules and essentially how the RAs developed the process for evaluating such conditions within each HA. Some of these components have been described below in more detail.

### Water Quality Conditions

After assessing available data sets, the water quality conditions in the watershed were prioritized and several were identified as those that RAs would focus their program efforts on – these are identified as highest priority water quality conditions (HPWQC) and priority water quality conditions (PWQC). The process the RAs developed for evaluating the PWQCs and determining those that were justifiably the highest was robust; each HPWQC has corresponding numeric goals and schedules and resulting strategies in order to achieve its goals. The RAs identified a comprehensive approach in selecting the HPWQCs in each HA. The process included evaluating available HA-specific data/information, reviewing regulatory drivers, and considering public input.

Table ES-2 summarizes the HPWQCs identified across the entire WMA. Analyzing data and information on a geographic basis allowed the RAs to prioritize their water quality issues, based on what is occurring geographically – leading to more focused goals and strategies addressing relevant geographic issues.

**Table ES-2: Highest Priority Water Quality Conditions by Hydrologic Area**

Hydrologic Area	Applicable Receiving Water*	Highest Priority Water Quality Condition (Condition, Pollutant, or Stressor)	Temporal Extent	Location of HPWQC Selection Rationale
Loma Alta	Loma Alta Slough	Eutrophic (nutrients)	Between May and October	Section 3.1.1
Buena Vista	Buena Vista Lagoon	Priority Water Quality Conditions addressed and strategies implemented	Not Applicable	Not Applicable – See Section 3.2.1 for more information
Agua Hedionda	Agua Hedionda Creek	Riparian Habitat Degradation	Dry and Wet Weather	Section 3.3.1
		Hydromodification Impacts	Dry and Wet Weather	Section 3.3.1
Encinas	Pacific Ocean	Strategies implemented	Not Applicable	Not Applicable – See Section 3.4.2, for more information
San Marcos	Lower – Pacific Ocean Shoreline at Moonlight Beach	Bacteria	Dry and Wet Weather	Section 3.5.1
	Upper – San Marcos Creek	Nutrients	Dry and Wet Weather	Section 3.5.1
Escondido	Escondido Creek	Riparian Habitat Degradation	Dry and Wet Weather	Section 3.6.1

\*While HPWQCs may not be identified for every receiving water, strategies addressing applicable HPWQCs and PWQCs are being implemented throughout the watershed and are included in each HA Section in Section 3 of this WQIP.

The RAs reviewed the following items when considering potential MS4 sources associated with the identified HPWQCs:

- Pollutant generating facilities, areas, and/or activities within the WMA
- Locations of the RAs MS4s
- Other known and suspected sources of non-storm water or pollutants in storm water discharges to receiving water within the WMA
- Review of available data, and
- Adequacy of available data to identify and prioritize sources and/or stressors associated with MS4 discharges that cause or contribute to the HPWQCs.

### Numeric Goals and Schedules

The WQIP establishes goals related to the highest priority water quality conditions. Furthermore, schedules for achieving these goals are included in the WQIP. Together, the goals and schedules establish the targets that the Responsible Agencies use for both establishing their programs as well as measuring



progress and achievement. Each highest priority water quality condition has established interim and final goals and schedules.

Interim goals are intended to mark temporal milestones to evaluate the progress that Responsible Agencies are making towards final goals. If goals are not met or conversely exceeded, that information can be used by the Agencies to adapt their programs to become as efficient and effective as resources allow.

### Strategies and Schedules

The WQIP identifies the strategies, or activities/best management practices (BMPs), that the RAs will implement to address the priority water quality conditions to progress towards achieving the numeric goals within the schedules identified. In addition to identifying the strategies, the WQIP identifies schedules for development and implementation of the strategies. Each jurisdiction developed a suite of strategies to help them achieve their identified goals and address PWQCs. The term *strategies* in this instance includes:

- planning efforts;
- structural BMPs;
- restoration or rehabilitation projects;
- program BMPs and/or core jurisdictional program strategies;
- requiring BMPs of regulated entities; and
- incentives.

Strategies include a wide range of activities, including, but not limited to:

- inspections at regulated facilities or sites;
- street sweeping and cleaning of storm drains;
- constructing structural and low impact development BMPs;
- requiring regulated entities (e.g., businesses, construction sites, residents) to implement BMPs;
- educating the general public on water quality issues;
- partnering with organizations to complete programs/projects; and
- enforcement actions against violators of Responsible Agencies' municipal codes.

### Monitoring and Assessment

The WQIP includes a Monitoring and Assessment program that is intended to measure the progress towards meeting the numeric goals established as well as improvements in Responsible Agencies' discharges and the receiving water bodies. Detailed Monitoring Plans for the Carlsbad WMA are separate documents and are available at the Project Clean Water Website – [www.projectcleanwater.org](http://www.projectcleanwater.org).

The RAs developed a monitoring program to collect data and information for the following purposes:

- Measure progress toward achieving the goals, strategies, and schedules;
- Measure progress toward addressing the PWQCs or HPWQCs;



**Low Impact Design BMP**



**Construction Site BMPs Implemented**



## Carlsbad WMA Water Quality Improvement Plan

- Evaluate each RA's overall efforts to implement the WQIP
- Evaluate water quality conditions in some receiving waters
- Measure MS4 contributions from select outfalls
- Provide rationale for program changes through the iterative process, and
- Measure compliance with TMDL(s) or similar regulatory drivers.

### Iterative Approach and Adaptive Management

The WQIP is intended to be a dynamic 'living' planning document that, through established long-term cycles, is assessed and updated to reflect collected data and input. The RAs will use information learned from plan implementation and water quality monitoring to improve management decisions related to water quality conditions, numeric goals, strategies and associated schedules. The typical cycle for the implementation, assessment and the next planning phase is illustrated in the figure below.



**Dry Weather Monitoring**



**Figure ES-2: Iterative Process to Inform Adaptive Management Process**

### WQIP Implementation

The RAs will implement the strategies, monitoring and assessment programs as described in the Carlsbad WQIP. Strategy implementation details are described in the eight Responsible Agencies' jurisdictional programs. The monitoring program details are described in the program specific monitoring plans. All of the related documents are available on the Project Clean Water website – [www.projectcleanwater.org](http://www.projectcleanwater.org).

## 1 Introduction

### 1.1 Background

On May 8, 2013<sup>2</sup>, the San Diego Regional Water Quality Control Board (RWQCB) adopted Order R9-2013-0001, a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems Permit (MS4 Permit or Permit), regulating discharges from Phase I municipal separate storm sewer systems (MS4s) in the San Diego Region (RWQCB, 2013). Provision B of the Permit requires Responsible Agencies (RA)s, in each of the region's Watershed Management Areas (WMA)s to develop Water Quality Improvement Plans (WQIP)s that identify water quality conditions and strategies to improve water quality within the watershed. Through the WQIP approach, Highest Priority Water Quality Conditions (HPWQC) within the WMA are identified, and strategies are implemented through the RAs' Jurisdictional Runoff Management Programs (JRMP)s to progressively improve water quality. The plans contain an adaptive planning and management process and a public participation component. This document represents the WQIP for the Carlsbad WMA.

### 1.2 Watershed Fundamentals

A watershed is an area of land that drains to a common waterway (e.g., receiving waters), such as a stream, lake, creek, estuary, wetland, lagoon or the ocean. Watersheds consist of waterways, habitat, wildlife and the people who live and work in the watershed. A healthy watershed provides many benefits to everyone and everything that uses and needs water.

Water flowing through a watershed connects upstream activities to the downstream watershed landscape. Introducing and increasing impervious surfaces, along with introducing dry weather runoff and pollutants<sup>3</sup> into the watersheds, may have impacts on the watershed or receiving waters, those waters that *receive* runoff, e.g. creeks, lagoons and Pacific Ocean.

#### 1.2.1 Waterbodies

Waterbodies are important features of watersheds. Water bodies include features such as rivers, creeks, lakes, estuaries, lagoons, and the ocean. They provide habitat for fish and other wildlife as well as water supply for surrounding riparian vegetative habitat. Also referred to as assimilative capacity, water bodies have an inherent ability to receive constituents of concern without damage to aquatic life or to humans, who depend on clean water for drinking, fishing, and recreation. To improve and/or preserve the health of California's water bodies, they have been assigned *beneficial uses*. These beneficial uses are resources, services, and qualities of the waters that provide maximum benefit to the people of the state (SWRCB 2016). Categories of beneficial use include, but are not limited to: habitat, recreational uses, habitat for fish, and endangered species.

#### 1.2.2 Vegetation

Vegetation serves a critical role in healthy watershed functions. Upland vegetative coverage slows runoff, reducing soil erosion and allowing infiltration and percolation to groundwater. Various types of vegetation also provide habitat for many wildlife species and nesting birds. Having a diverse native vegetative landscape promotes a diverse well-functioning ecosystem for wildlife.

The collections of plants found adjacent to waterways is called riparian vegetation. Depending on the type of plant species within the riparian corridor, riparian vegetation can play a significant role in filtering pollutants and sediments from surface water flow prior to entry into receiving waters. Through root systems, riparian vegetation act as stream bank stabilization, preventing erosion and bank failures.

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<sup>2</sup> See [http://www.swrcb.ca.gov/rwqcb9/water\\_issues/programs/stormwater/](http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/stormwater/)

<sup>3</sup> The use herein of the terms "pollutant(s)" and "pollution" should not be construed as an admission by the Responsible Agencies that the substances referenced herein constitute "pollutants" as that term is used in the context of liability insurance "pollution" exclusions as construed by California insurance law.

Furthermore, some riparian vegetation may act as energy dissipation under high stream flow conditions, thereby reducing erosion and also allowing sedimentation to occur.

### 1.2.3 Wetlands

Wetlands may be found in riparian areas and provide a variety of functions that support a healthy watershed. Wetlands can act as natural detention systems that slow down the movement of floodwaters along creeks and rivers. By trapping sediments, filtering pollutants and absorbing nutrients, wetlands can improve water quality and prevent downstream impacts. Wetlands also provide habitat for wildlife and fish, creating ecosystems.

### 1.2.4 Connectivity

Connectivity is a term used for the biological, hydrological, and physical processes that occur within the watershed. These processes or pathways include the free flow of water downstream, the passage of fish, and the interface with bed and banks of natural waterways. Connectivity is an important feature of watershed function.

### 1.2.5 Potential Impacts to Watersheds

As land is converted by development and impervious surfaces are added, natural processes may be altered and impacts to the watershed can occur. These impacts may include:

- the loss of upland vegetation and their beneficial properties;
- reduced infiltration to replenish subsurface groundwater flow;
- increased flow rates, volume or duration of surface water runoff causing hydromodification impacts to the natural conveyance systems, including erosion, loss of riparian habitat, down-cutting of stream beds and downstream sedimentation;
- pollutant generation from anthropogenic activities and transport of the pollutants to the receiving waters via storm drain infrastructure, as well as other routes (i.e., direct discharges, sheet flow, etc.);
- loss of watershed connectivity and riparian habitat and replacement with flood control structures to protect properties; introduction of dry weather runoff from over-irrigation and other dry weather anthropogenic discharges, potentially causing an imbalance of freshwater in the watershed system or bacteria regrowth in the storm drain system; and
- introduction of water from imported sources.

These potential impacts can affect the beneficial uses of downstream receiving waters. However, there are practices and strategies that can be implemented to reduce the impacts, to protect, enhance, restore, and maintain the receiving waters' beneficial uses.

## 1.3 Purpose and Practice of Water Quality Improvement Plan

The purpose of the Carlsbad WQIP is to guide the RAs' JRMPs towards achieving improved water quality in Municipal Separate Storm Sewer System (MS4) discharges (or storm water discharges), and receiving water bodies. RAs' JRMPs contain the strategies, standards and protocols by which each RA will implement their individual program in response to the priorities and goals established in the WQIP. An important note for consideration regarding the Carlsbad WQIP is the context within which the MS4 permit and the WQIP operate. The permit regulates discharges from the Copermittees' MS4 systems prior to discharge into receiving water bodies, therefore, some conditions within the receiving waters may be outside of the Copermittees' sphere of influence.

In a developed watershed, the features and potential impacts described in section 1.2 above are interconnected. Through the WQIP, the RAs examine the interconnectivity of these features and impacts to make management decisions to improve water conditions quality in the receiving water bodies. There are many natural features of watersheds that can be preserved or enhanced to improve the conditions of

receiving waters. Furthermore, control of the impacts from anthropogenic activities, i.e. dry weather flow reduction and pollutant discharge from storm drain systems, is imperative for improving water quality conditions in the receiving water bodies. Figure 1 on the following page illustrates some of the features and impacts within a watershed as well as some examples of strategies that may be implemented to mitigate the impacts of developed watersheds.





Figure 1: Watershed Benefits, Impacts, and Improvements Example

The Permit's intent is to enable jurisdictions to *focus* their resources and efforts to “effectively prohibit non-storm water discharges to its MS4, reduce pollutants in storm water discharges from its MS4 to the Maximum Extent Practicable (MEP), and achieve the interim and final numeric goals...” (RWQCB, 2013). Furthermore, the Permit also states that, “where appropriate, Watershed Management Areas may be separated into subwatersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water” (RWQCB, 2013). This approach represents a paradigm shift from previous permits that led jurisdictions to implement a suite of activities throughout their jurisdictions with minimal consideration of geographically specific water quality conditions, sources and pollutant-generating activities.

The Permit places a greater emphasis on adaptive management, whereby information gathered and analyzed from program implementation and monitoring will be used to adapt the WQIP to become more effective in achieving water quality improvements. This employs a five-year cycle of adaptive management that includes planning, implementation and assessment phases that rely upon one another for information to improve the plan's efficiency and overall effectiveness. This five-year cycle is illustrated in Figure 2.

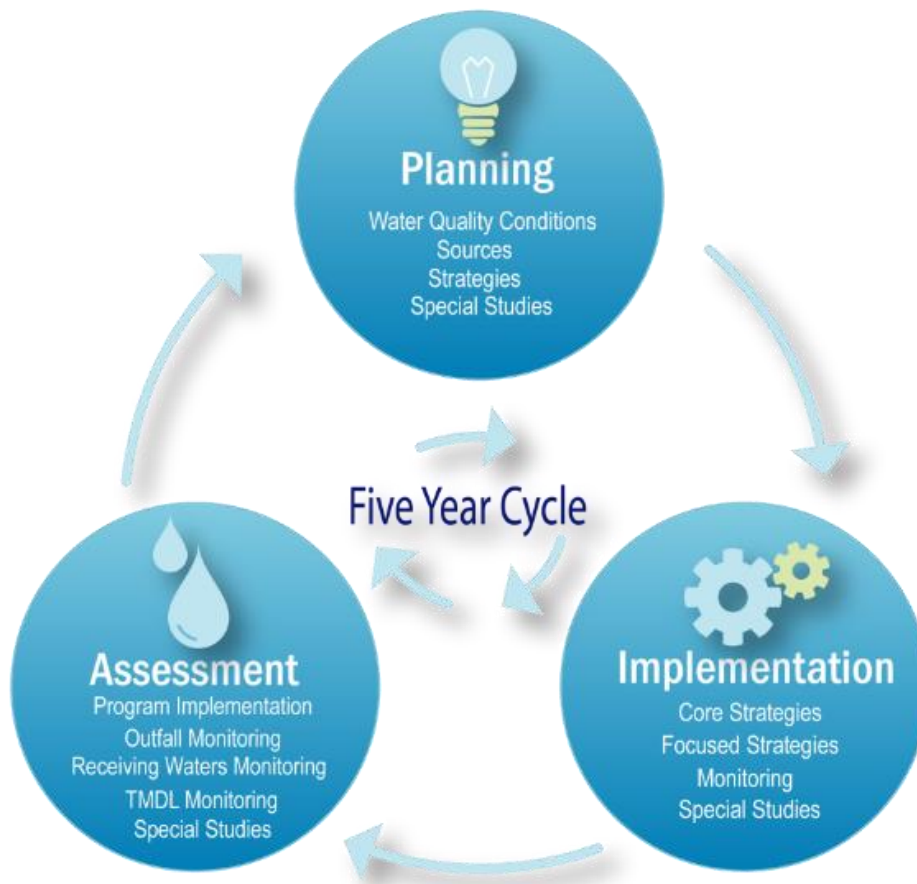


Figure 2: Five-Year process for Planning, Implementation and Assessment of WQIP



During each planning process, information from assessments and special studies will be used to inform the program planning process. As RAs learn more about sources and strategies, and evaluate water quality monitoring data and analyses, informed plan modifications may be made to the WQIP to:

- 1) Reprioritize water quality conditions;
- 2) Modify numeric goals and/or schedules;
- 3) Improve and/or expand the selection of water quality improvement strategies; and
- 4) Make general improvements to the plan.

The WQIP is intended to be a living planning document that, through established long-term cycles, is updated and revised<sup>4</sup> to reflect collected data and input. As each assessment process in a cycle concludes, the WQIPs will be re-evaluated and will influence the next planning process (see Figure 3). The potential WQIP modifications identified above will be evaluated on at least a five-year cycle. These cycles will allow for the critical step of monitoring potential sources, pollutant generating activities and the effectiveness of implemented strategies. The five-year cycle is consistent with the MS4 Permit reissuance process and provides the appropriate duration for improvements to be observed, measured and assessed.

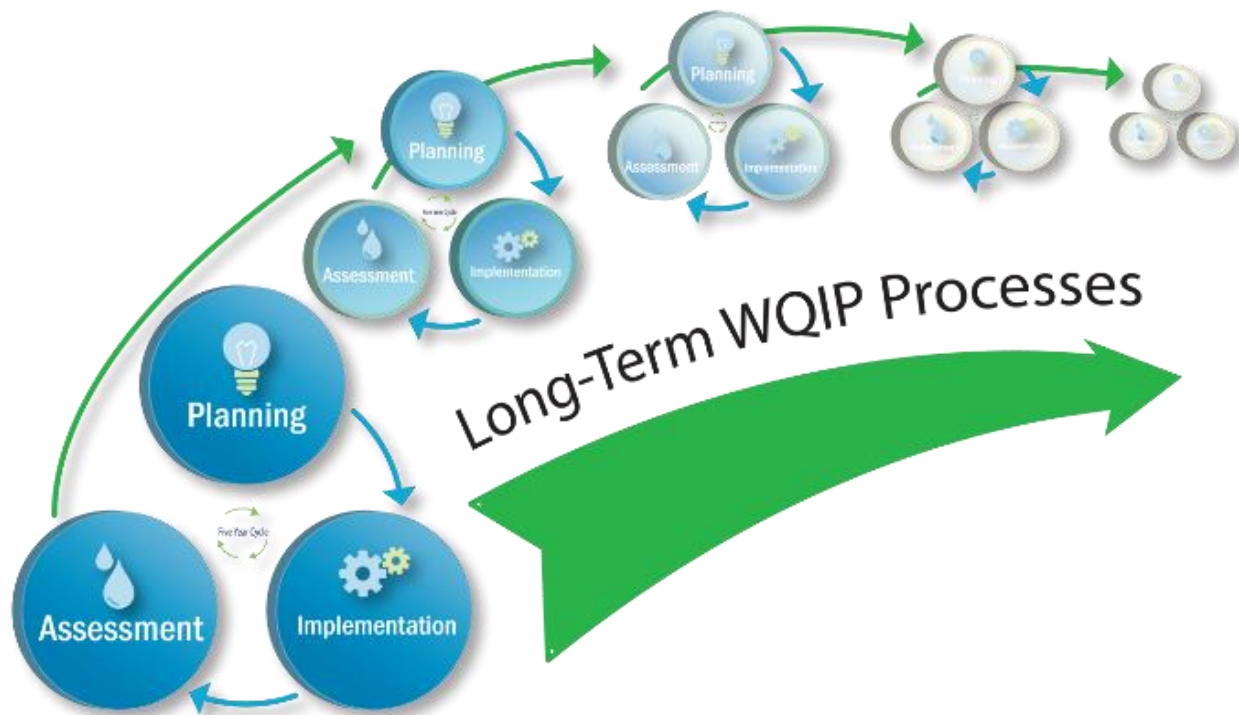


Figure 3: Long-Term WQIP Process

#### 1.4 Carlsbad Watershed Management Area Description

The Carlsbad WMA is approximately 211 square miles and is formed by a group of six individual watersheds in northern San Diego County. The WMA includes the entire Cities of Carlsbad, San Marcos and Encinitas and portions of the cities of Oceanside, Vista, Escondido, Solana Beach, and San Diego County unincorporated areas. The WMA is bordered by the San Luis Rey River WMA to the north and by the San Dieguito River WMA to the south (see Figure 4). It reaches inland nearly 24 miles to just northeast of Lake Wohlford. The maximum elevation of the WMA is approximately 2,400 feet and it extends to sea level at the Pacific Ocean. The land use consists of residential, commercial/industrial, freeways,

<sup>4</sup> Per Provision F.2.c.(1)(c) – Responsible Agencies must submit updates to the WQIP either in the WQIP Annual Reports, or as part of the Report of Waste Discharge.

agriculture, and vacant/undeveloped areas. About 75 percent of the land is privately owned. The Carlsbad WMA is the third most densely populated watershed in the San Diego Region.

The Carlsbad WMA is made up of six distinct Hydrologic Areas (HA)s: Loma Alta, Buena Vista Creek, Agua Hedionda, Encinas, San Marcos Creek, and Escondido Creek - all of which have separate points of discharge (Figure 5). Due to the impoundment of waters at Lake San Marcos, the San Marcos HA is split into two separate drainage areas: the drainage area above Lake San Marcos (also known as Upper San Marcos Creek); and the drainage area below Lake San Marcos (also known as Lower San Marcos Creek). The Carlsbad watershed is known for its numerous lagoons, including four unique coastal lagoons: Buena Vista Lagoon, Aqua Hedionda Lagoon, Batiquitos Lagoon, and San Elijo Lagoon.

The RAs within the Carlsbad WMA include the following municipalities:

- City of Carlsbad
- City of Encinitas
- City of Escondido
- City of Oceanside
- City of San Marcos
- City of Solana Beach
- City of Vista
- County of San Diego

The jurisdictional breakdown (by land area) for each of the six HAs (watersheds) is shown in Table 1 below.

**Table 1: Jurisdictional Breakdown of Carlsbad WMA**

Watershed (HA No.)	Ultimate Receiving Waterbody(ies)	Size (sq. mi.)	Percentage of WMA (%)	Jurisdictional Breakdown							
				Carlsbad (%)	Encinitas (%)	Escondido (%)	Oceanside (%)	San Diego County (%)	San Marcos (%)	Solana Beach (%)	Vista (%)
<i>Carlsbad WMA (904)</i>	<i>Pacific Ocean</i>	<i>211.5</i>	<i>100</i>	<i>18</i>	<i>9</i>	<i>13</i>	<i>8</i>	<i>32</i>	<i>11</i>	<i>1</i>	<i>8</i>
Loma Alta (904.10)	Loma Alta Slough and Pacific Ocean	9.8	4.5	0	0	0	97	0	0	0	3
Buena Vista Creek (904.20)	Buena Vista Lagoon and Pacific Ocean	22.6	11	19	0	0	25	11	0	0	45
Aqua Hedionda (904.30)	Aqua Hedionda and Pacific Ocean Lagoon	29.4	14	41	0	0	6	24	5	0	24
Encinas (904.40)	Pacific Ocean	5.4	2.5	100	0	0	0	0	0	0	0
San Marcos (904.50)	Batiquitos Lagoon and Pacific Ocean	59.7	28	29	15	5	0	18	33	0	0
Escondido Creek (904.60)	San Elijo Lagoon and Pacific Ocean	84.6	40	0	11	29	0	55	4	1	0

## Carlsbad WMA Water Quality Improvement Plan

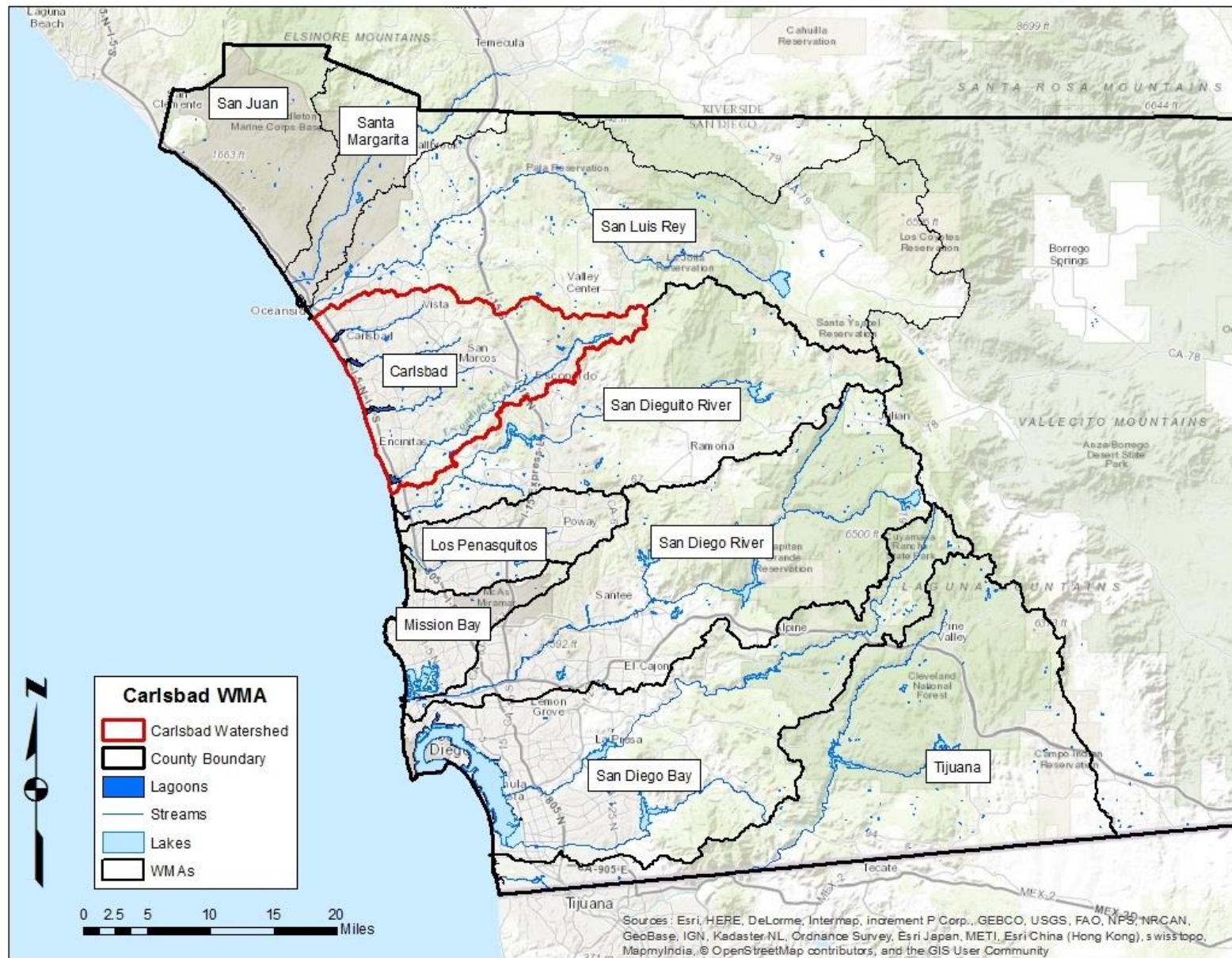


Figure 4: Carlsbad Watershed Management Area within the San Diego Region



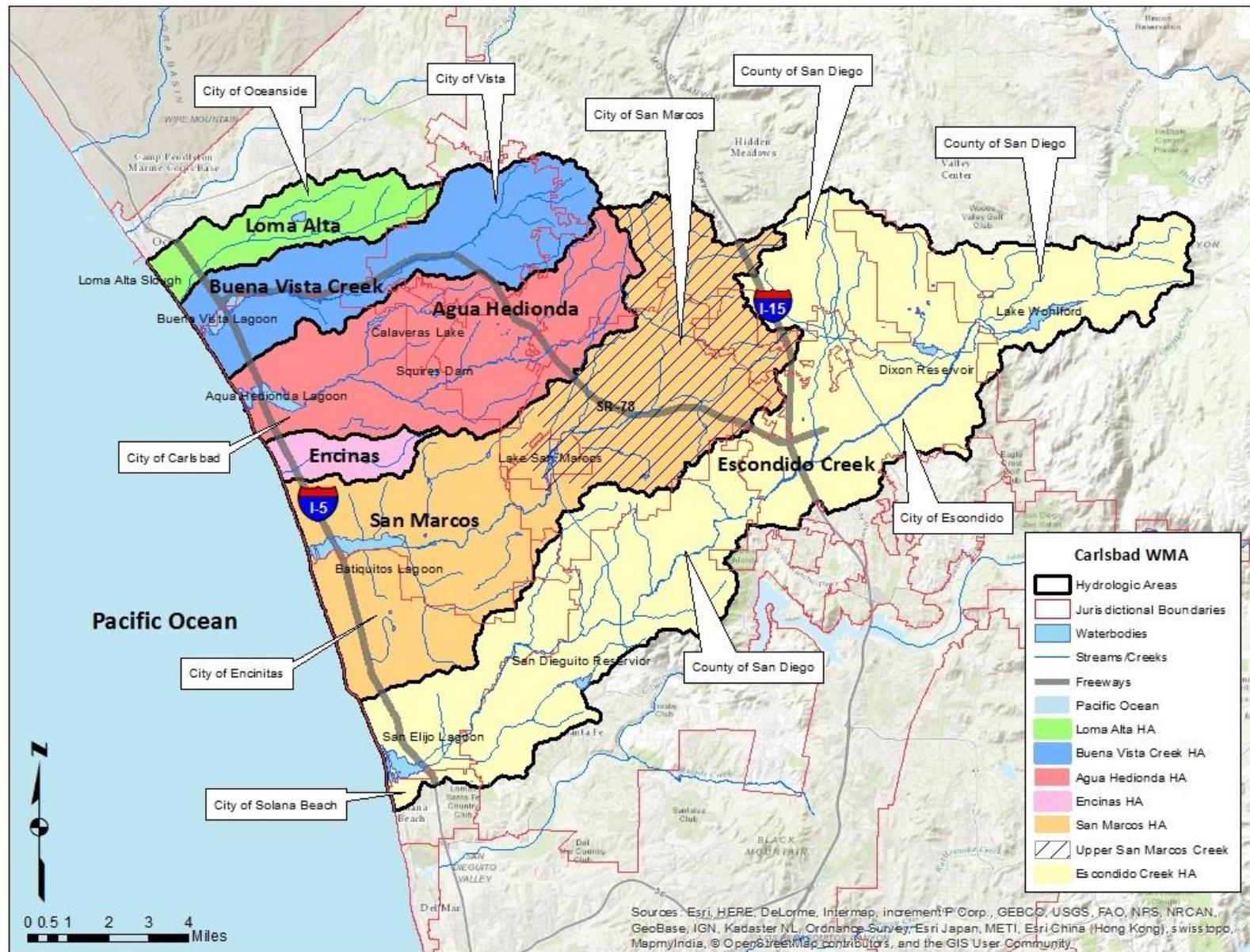


Figure 5: Carlsbad Watershed Management Area

## 1.5 WQIP Development and Updates

The WQIP was developed over a two-year period after the Permit was adopted in May 2013. The development process set two-phased benchmarks for the development and submittal of the components of the WQIP. Phase 1 focused on the Priority Water Quality Conditions (PWQC)s and identification of HPWQCs. Phase 2 focused on the identification of water quality numeric goals and schedules for achieving such goals, as well as identification of water quality improvement strategies to address the sources of pollutants contributing to the HPWQCs and in some cases, the PWQCs. The results of Phase 1 and Phase 2 were previously submitted to the RWQCB for public comment and are summarized in Sections 2.1, 2.2, 2.3 and 2.4.

Phase 3 of the process included the development of the Monitoring and Assessment Programs that are integral to the WQIP iterative process. The iterative process, including the Monitoring and Assessment Programs, is included in Sections, 2.5, 2.6 and 2.7.

The steps taken in developing the Carlsbad WMA WQIP included identifying:

- 1) Prioritized water quality conditions, where sufficient data is available for each HA within the Carlsbad WMA. From this list of prioritized water quality conditions, the HPWQCs for each HA were selected.



**Water Quality Improvement Consultation Panel Briefing – January 22, 2014**

- 2) Those sources that are most likely to contribute (having the greatest threat to water quality) to the HPWQC for each selected condition.
- 3) A list of potential water quality improvement strategies that RAs can identify for implementation, either jurisdictionally or in cooperation with other RAs or entities, with the goal of improving water quality.
- 4) Areas of focus where numeric goals will be established and strategies implemented to improve water quality.
- 5) Numeric goals and schedules for improvements to water quality and water quality conditions.
- 6) Water quality improvement strategies and schedules for implementation. The identified strategies represent the activities the RAs will implement in order to make water quality improvements that will have positive impacts on the selected highest and priority water quality conditions.

The RAs took a holistic approach, evaluating the Carlsbad WMA as a whole, when it came to reviewing pollutants and stressors in MS4 discharges that threatened water quality in the WMA. After an initial assessment and identification of priority water quality conditions, each HA was individually examined based on available data and information to determine HPWQC goals, and strategies to address water quality conditions specific to each HA.



### 1.5.1 Public Participation Process

During the two-year development process, public participation was a critical element. The WQIP process relied heavily on an active public participation process which led to a greater amount of public participation than in previous MS4 Permit-related water quality planning processes. The public participation process included four primary components:

- 1) Public input in response to calls for data
- 2) Public workshops
- 3) Water Quality Improvement Consultation Panel and
- 4) RWQCB public comment periods.

During the plan development process, the RAs held two public workshops (November 2013 and July 2014) to inform the public of the WQIP process and solicit input for water quality conditions; sources contributing to water quality conditions; strategies to address the sources; numeric goals and associated schedules. As a result of the solicitations, the public provided a variety of data and information for consideration in the planning process.

The RA selected a Water Quality Improvement Consultation Panel (WQICP) from interested candidates. The WQICP consisted of a primary and alternate from the: RWQCB staff; development interests; and environmental community – see Table 2. The intent of the WQICP was to provide a “sounding board” for the developed plan elements. Serving on the WQICP was an intensive undertaking, requiring familiarity with the MS4 permit, water quality issues and a familiarity with the vast and diverse Carlsbad WMA. The Carlsbad WQICP met January 2014 and October 2014 to discuss WQIP elements and provide feedback to the RAs. The Carlsbad WQICP has been dedicated throughout the process and has provided excellent input during meetings as well as in written comment form.



**Water Quality Improvement Consultation Panel Briefing – October 28, 2014**

**Table 2: Carlsbad WMA Water Quality Improvement Consultation Panel**

Name	Representing	Status
Ms. Laurie Walsh	RWQCB	Primary
Mr. Eric Becker	RWQCB	Alternate
Mr. Gregory McBain	Environmental Community	Primary
Mr. Brad Roth (replaced Mr. Doug Gibson)	Environmental Community	Alternate
Mr. Steve Gruber	Development Community	Primary
Mr. Tory Walker	Development Community	Alternate

As RAs delivered the two phased submittals to the RWQCB, 30-day public comment periods were initiated and facilitated by RWQCB staff. Each of the public comment periods yielded comments for consideration in final WQIP.



### 1.5.2 WQIP Submittal and Implementation

The Carlsbad WMA WQIP was submitted to the San Diego Regional Water Quality Control Board (RWQCB) on June 26, 2015. The RWQCB issued a public notice on June 29, 2015 and released the Carlsbad WMA WQIP for a 30-day public review and comment period commencing on July 31, 2015. The RAs held a public workshop on July 7, 2015 to provide an overview of the Carlsbad WQIP and answer any questions. The RAs considered revisions to the WQIPs, based on written comments received, and submitted WQIP revisions to the RWQCB 60-days after the close of the public comment period.

The RAs received a comment letter from RWQCB staff on August 5, 2015 which included general comments on the region's submitted WQIPs and served as a notice of noncompliance for all of the WQIPs submitted. RWQCB staff provided a Carlsbad WQIP-specific checklist on August 19, 2015 that listed areas of the plan the RWQCB staff identified as unacceptable and/or noncompliant with the requirements of the Permit. As a result, the RAs participated in collaborative discussions and meetings with RWQCB staff to resolve the issues identified by the RWQCB staff. Based on the feedback the RAs received from the RWQCB staff via email, discussions, and meetings, changes were made throughout the Carlsbad WMA WQIP between August 5, 2015 and September 29, 2015 to address the issues noted by RWQCB staff. The document was resubmitted on September 29, 2015.

The RAs were notified at a meeting and via email on December 17, 2015 that RWQCB staff still believed there were issues with the September 2015 submittal of the Carlsbad WQIP and that the document would not be deemed acceptable by staff. Based on RWQCB staff's request, the RAs began re-evaluating and revising the Carlsbad WQIP. During the revision process, RAs met weekly with RWQCB staff and provided interim deliverables to ensure RAs were moving forward with acceptable revisions. On March 15, 2015, during the revision process, the Carlsbad RAs received a letter entitled "Notice of Rejection and Second Notice of Noncompliance" from RWQCB staff. The revised Carlsbad WQIP was submitted to the RWQCB on June 30, 2016 and will be released by the RWQCB for a 30-day public comment period.

Once the Carlsbad WMA WQIP is deemed compliant and acceptable by the RWQCB Executive Officer, the RAs will commence with implementation of WQIP elements (those elements which are not already being implemented as part of each jurisdiction's JRMP).

### 1.5.3 Regional Clearinghouse

RAs will use existing data-sharing templates to facilitate compilation of watershed-wide datasets for assessment and reporting purposes. Regional data-sharing templates exist for receiving water monitoring, MS4 outfall monitoring, field screening, and Illicit Discharge Detection Elimination (IDDE) reporting. RAs will make the following data and documentation available to the public on the Project Clean Water website [www.projectcleanwater.org](http://www.projectcleanwater.org):

- Carlsbad Watershed WQIP and all updated versions with date of update
- Annual Reports for the watershed
- JRMP document for each RA within the watershed and all updated versions with date of update
- Best Management Plan (BMP) Design Manual for each RA within the watershed and all updated versions with date of update
- Reports from special studies conducted in the watershed
- Monitoring data uploaded to the California Environmental Data Exchange Network (CEDEN) with links to the uploaded data
- Geographic information system (GIS) data, layers, and/or shape files that are available for distribution and used to develop the maps to support the Water Quality Improvement Plan, Annual Reports, and Jurisdictional Runoff Management Programs

#### 1.5.4 Plan Updates

The RAs will prepare annual reports and as necessary, updates to the WQIP based upon the iterative, adaptive management process described in Section 1.3. Updates to the WQIP will follow a similar public participation process as the WQIP development and include a solicitation for data and information, and consultation with the WQICP. Updates can be provided in the WQIP annual reports or the Report of Waste Discharge (ROWD), which is required no later than December 2017.

Plan updates would include any significant changes to:

- Priority water quality conditions
- HPWQC
- Numeric goals and schedules
- Strategies and schedules
- Monitoring program, and
- Assessment program.

Minor modifications to the WQIP or implementing JRMPs will be presented in JRMP and WQIP annual reports. These types of changes may include modifications to activity frequencies, inspected inventories, and areas of focus. Minor modifications may arise after short time periods, based on the implementation feedback process and require quick management decisions that will support the goals and schedules identified.

#### 1.6 Document Organization

The remainder of the document is organized as follows:

Section 2 describes the process for development of the WQIP. In addition to the general overview of the WQIP components, data and information used for the development process are presented in Section 2.

Section 3 of the document presents the plan components for each of the hydrologic areas (HAs) with specific details for each RA that are located within each of the presented HAs. Section 3 describes the HPWQC selection, goals, strategies and schedules, and monitoring and assessment for each HA. The strategies to be implemented in the HA are presented in tabular format. Each table provides the strategies, RAs implementing the strategies, planned implementation schedules, target pollutants/stressors/conditions addressed, target sources addressed, and the target temporal extent. These HA subsections of the document are intended to be able to stand alone, and therefore some information may be repetitive from Section 2.

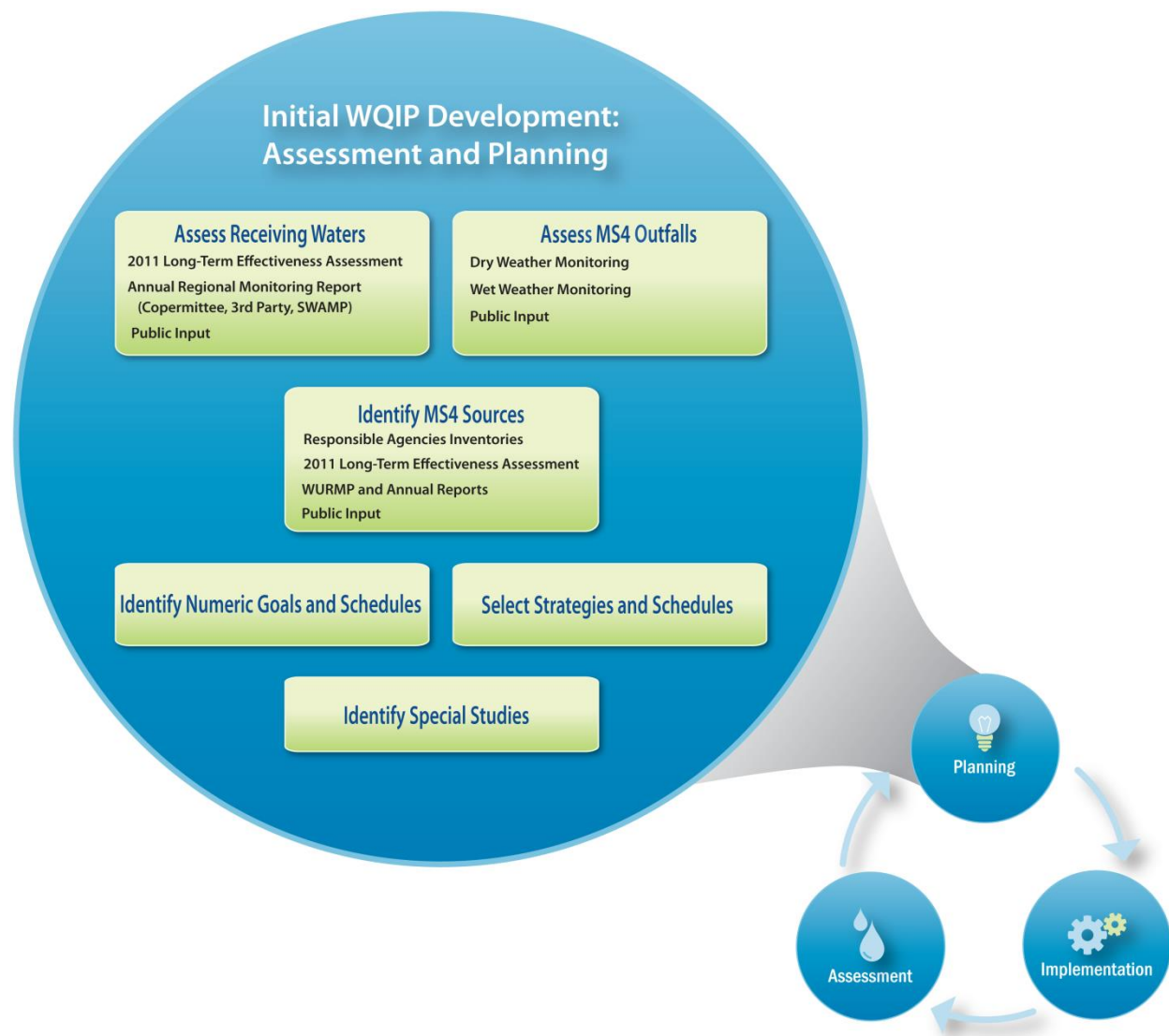
Section 4 provides the references that were used in the development of this WQIP.

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## 2 Water Quality Improvement Plan Components

The following section provides descriptions and information on the Water Quality Improvement Plan components identified in Permit Provision B. The required information on water quality conditions, water quality improvement goals, strategies and schedules, water quality improvement monitoring and assessment program, and iterative and adaptive management process are all discussed in this section. The section will provide the general approach, data and information, and analysis that went into each component. Section 3 of this WQIP provides the HA-specific detailed information for each WQIP component required in Permit Provision B.

For the development of this initial WQIP, the planning process included both assessment and planning elements. Although previous watershed-based plans were developed and implemented, i.e., Watershed Urban Runoff Management Plans (WURMP)s and some limited number of Watershed Management Plans (WMP)s, this foundational WQIP required an assessment of a more comprehensive set of data and information, i.e., public input and data. This planning/assessment element is illustrated in Figure 6.



**Figure 6: Initial WQIP Development Process – Planning Consisting of Assessment**

Per Permit requirements, numeric goals, strategies, and schedules were then developed for each HPWQC. Strategies and BMPs typically address multiple conditions; therefore, it is anticipated that all PWQCs, and other conditions not identified as priority, will be improved by the implementation of water quality improvement strategies identified to target measureable and quantifiable improvements to the HPWQC(s).

## 2.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess and prioritize water quality conditions within the Carlsbad WMA. Permit Provision B.2. requires the RAs to identify the water quality priorities within the WMA that will be addressed by the WQIP. Water quality conditions assessed that warranted further consideration were required to be identified as priority water quality conditions (PWQCs). A subset of the PWQCs were subsequently required to be selected as the highest priority water quality condition(s) (HPWQC).

The efforts to gather data and information and assess and prioritize water quality conditions included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Holding facilitated workshops to receive input from the public and the watershed consultation panel
- Reviewing and analyzing the available data and information as summarized in Table 3 and 4

Permit provisions B.2.a. and B.2.b. specify a minimum list of items to be considered when identifying water quality priorities based on the “impacts of MS4 discharges on receiving water beneficial uses”. In accordance with Permit Provision B.2.c., this data and information for all conditions (biological, physical, and chemical) was reviewed to develop a list of priority water quality conditions as pollutants, stressors, and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of the receiving waters.

The required considerations (Permit Provision B.2.a.) and the datasets evaluated using the best available current data and information are identified in Table 3.

**Table 3: Required Considerations and References for Data and Information for  
Assessment of Receiving Water Conditions (Provision B.2.a.)**

Receiving Water Considerations (Provisions B.2.a.)	Data and Information
(1) Receiving waters listed as impaired on the CWA Section 303(d) List of Water Quality Limited Segments (303(d) List);	Final California 2010 Integrated Report (303(d) List/305(b) Report) Regional Board 9 - San Diego Region
(2) Total Maximum Daily Load (TMDLs) adopted and under development by the San Diego Water Board;	San Diego Regional Water Quality Control Board: <a href="http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/index.shtml">http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/index.shtml</a>
(3) Receiving waters recognized as sensitive or highly valued by the Copermittees, including estuaries designated under the National Estuary Program under CWA section 320, wetlands defined by the State or U.S. Fish and Wildlife Service's National Wetlands Inventory as wetlands, waters having the Preservation of Biological Habitats of Special Significance (BIOL) beneficial use designation, and receiving waters identified as ASBS subject to the provisions of Attachment B to State Water Board Resolution No. 2012-0012 (see Attachment A);	San Diego Regional Water Quality Control Board: Basin Plan, April 4, 2011
(4) The receiving water limitations of Provision A.2;	Order R9-2013-0001 Provision A.2.
(5) Known historical versus current physical, chemical, and biological water quality conditions;	<p>RAs Input</p> <ul style="list-style-type: none"> <li>Long Term Effectiveness Assessment, 2011 (<i>see LTEA Description Box on following page</i>)</li> <li>Regional Annual Monitoring Reports</li> <li>2008 WURMP and WURMP Annual Reports</li> <li>Best professional judgement and historical institutional knowledge</li> </ul> <p>Public Input:</p> <ul style="list-style-type: none"> <li>Carlsbad Watershed Management Plan</li> <li>Buena Vista Creek Watershed</li> <li>Cottonwood Creek Report</li> </ul>
(6) Available, relevant, and appropriately collected and analyzed physical, chemical, and biological receiving water monitoring data, including, but not limited to, data describing: <ul style="list-style-type: none"> <li>(a) Chemical constituents,</li> <li>(b) Water quality parameters (i.e. pH, temperature, conductivity, etc.),</li> <li>(c) Toxicity Identification Evaluations for both receiving water column and sediment,</li> <li>(d) Trash impacts,</li> <li>(e) Bioassessments, and</li> <li>(f) Physical habitat;</li> </ul>	<p>Long-Term Effectiveness Assessment, 2011</p> <p>Regional Annual Monitoring Reports</p> <p>2008 WURMP and WURMP Annual Reports</p> <p>Public Input:</p> <ul style="list-style-type: none"> <li>San Diego Coastkeeper Carlsbad Hydrologic Unit data</li> <li>Buena Vista Creek California Rapid Assessment Method(CRAM) data</li> <li>The Escondido Creek Conservancy Water Quality Sampling Data Sheets</li> <li>Buena Vista Data Report</li> <li>IBI/Taxonomic data for Buena Vista Creek</li> <li>Cottonwood Creek Report</li> <li>Surface Water Ambient Monitoring Program Report on the Carlsbad Hydrologic Unit</li> </ul>
(7) Available evidence of erosional impacts in receiving waters due to accelerated flows (i.e. hydromodification);	<p>RAs Input</p> <ul style="list-style-type: none"> <li>Agua Hedionda Watershed Management Plan</li> <li>Regional Annual Monitoring Reports</li> </ul> <p>Public Input:</p> <ul style="list-style-type: none"> <li>Carlsbad Watershed Management Plan</li> <li>Buena Vista Creek Watershed</li> <li>Revealing Escondido Creek</li> <li>Carlsbad Watershed Network Letter</li> <li>San Elijo Lagoon Committee Letter</li> </ul>

Receiving Water Considerations (Provisions B.2.a.)	Data and Information
(8) Available evidence of adverse impacts to the chemical, physical, and biological integrity of receiving waters; and	RAs Input The Escondido Creek Watershed Restoration Action Strategy Public Input: <ul style="list-style-type: none"> <li>Buena Vista Creek Watershed</li> <li>Cottonwood Creek Report</li> <li>Carlsbad Sanitary Sewer Survey</li> <li>Surface Water Ambient Monitoring Program Report on the Carlsbad Hydrologic Unit</li> <li>Carlsbad Watershed Network Letter</li> </ul>
(9) The potential improvements in the overall condition of the Watershed Management Area that can be achieved.	Not quantifiable at this time. Using Best Professional Judgment.

The required minimum considerations (taken from Provision B.2.b.) and the datasets/information evaluated are identified in the table below.

**Table 4: Required Considerations and References for Data and Information for Assessment of Impacts from MS4 Discharges (Provision B.2.b.)**

MS4 Discharge Required Considerations (Provisions B.2.b.)	Data and Information
(1) The discharge prohibitions of Provision A.1 and effluent limitations of Provision A.3; and	Order R9-2013-0001 Provisions A.1. and A.3.
(2) Available, relevant, and appropriately collected and analyzed storm water and non-storm water monitoring data from the Copermittees' MS4 outfalls;	<ul style="list-style-type: none"> <li>Long-Term Effectiveness Assessment, 2011</li> <li>Regional Annual Monitoring Reports</li> <li>MS4 Outfall Monitoring Data</li> <li>3rd Party Data, e.g., Coastkeeper and other</li> </ul>
(3) Locations of each Copermittee's MS4 outfalls that discharge to receiving waters;	RAs – See mapping in Appendix A
(4) Locations of MS4 outfalls that are known to persistently discharge non-storm water to receiving waters likely causing or contributing to impacts on receiving water beneficial uses;	RAs – See mapping in Appendix A
(5) Locations of MS4 outfalls that are known to discharge pollutants in storm water causing or contributing to impacts on receiving water beneficial uses; and	RAs – See mapping in Appendix A
(6) The potential improvements in the quality of discharges from the MS4 that can be achieved.	Using Best Professional Judgment



The Carlsbad WQIP process for identifying PWQCs uses a Multiple Lines of Evidence (MLOE) approach. The MLOE approach uses information derived from multiple sources to support its findings. In the case of identifying PWQCs, using the MLOE approach included identifying the data and information to be used in the analysis. In addition to the sources of data and information identified in Table 3 and 4, the following were also considered in identifying PWQCs:

1. Standards/criteria for water quality conditions, e.g., TMDL numeric targets, water quality objectives
2. MS4 source information regarding contributions to receiving water issues

The MLOE were grouped into three major categories for consideration when identifying priority water quality conditions: 1) Regulatory drivers; 2) RAs' water quality data and information; and 3) Public input and other work efforts, including third party water quality data and other science-based assessments.

### Long-Term Effectiveness Assessments

The 2005 Baseline Long-Term Effectiveness Assessment and 2011 Long-Term Effectiveness Assessment (LTEA) (MOE, 2005 & 2011) analyzed and evaluated much of the water quality analysis and regulatory drivers required per Provisions B.2.a. and B.2.b. These assessments include evaluations of Responsible Agencies' receiving water (including Mass Loading Stations and Temporary Watershed Assessment Stations) and MS4 outfall water quality monitoring data during dry and wet weather conditions, bioassessments, sediment monitoring, toxicity monitoring, and 3<sup>rd</sup> party monitoring data. Since the development of the 2011 LTEA, there has been additional monitoring to include in the evaluation, however, the LTEA provides the most recent comprehensive analysis of the state of water quality conditions in the Carlsbad WMA and is relied upon heavily for this initial WQIP development effort.

Where there are consistencies between the three MLOE categories, it suggests that the water quality condition warrants consideration for the initial priority listing. In addition, where there are strong correlations amongst two of the three lines of evidence, e.g., regulatory drivers and water quality data, it also suggests that the water quality conditions warrant consideration for the initial priority listing.

### 2.1.1 Priority Water Quality Conditions

PWQCs are conditions within the WMA's receiving waters that, based on the best available data and information, warrant focused attention through the identification and implementation of water quality improvement strategies. Furthermore, "where appropriate, Watershed Management Areas may be separated into sub-watersheds to *focus water quality prioritization and jurisdictional runoff management program implementation* efforts by receiving water" (Order R9-2013-0001). The Carlsbad WMA consists of six unique HAs that warrant separate analyses for water quality prioritization and program implementation. While all the HAs are part of the Carlsbad WMA, the HAs are all hydrologically disconnected with distinct creek systems that drain to separate watershed outlets. Therefore, the process for prioritization, goal setting and resulting program implementation is separated by hydrologic area in this WQIP.

#### Priority Water Quality Conditions

Priority water quality conditions are pollutants, stressors, and/or receiving waters conditions that have been identified through an assessment process as requiring improvement. The assessment process is described in this section. From the list of priority water quality conditions Responsible Agencies will select a subset as the highest priority water quality conditions as described in Section 2.2.

In preparing for identification of PWQCs, data and information were collected, reviewed, categorized and compared. Tables 3 and 4 on the following pages present the available MLOE on a HA basis. In some HAs, there was discrete data and information making it appropriate to separate the information into Hydrologic Sub-Areas (HSAs).

Table 5 summarizes the findings of the regulatory drivers and the RAs' MS4 program water quality data and information collected for each of the six HAs in the Carlsbad WMA. Table 6 summarizes the input provided through the public process.

Using Tables 3, 4, 5, and 6, several categories of conditions were identified across the three primary lines of evidence. Based on the MLOE approach, these conditions are identified as the Carlsbad WMA PWQCs and are identified in Table 7. General descriptions of the PWQCs identified are summarized below.

#### **Nutrients/Eutrophic Conditions**

Eutrophication is a process by which there is an increase in nutrients (e.g. nitrate, phosphate) to a waterbody. This process may occur naturally or can be the result of anthropogenic activity. The oversupply of nutrients in a waterbody promotes excessive plant and algae growth. When the algae and plants die, the high levels of organic matter from decomposing organisms deplete the available oxygen in the body of water. The depletion of oxygen can result in the death of other organisms such as fish. While eutrophication is a natural, slow-aging process for a water body, anthropogenic inputs can greatly speed up the process and result in degradation of the water body and habitat.

Based on regulatory drivers, review of water quality data, 303(d) listings, and public input, nutrients and/or eutrophic conditions have been identified as PWQCs for the water bodies within the Carlsbad WMA identified in Table 7.

#### **Indicator Bacteria**

Indicator bacteria (*Total Coliform*, *Fecal Coliform*, and *Enterococcus*) are types of bacteria that are used to detect and estimate the level of bacterial and pathogen contamination in a waterbody. While most bacteria are beneficial and responsible for important environmental process such as decomposition, nutrient cycling and the breakdown of environmental toxins, there are some bacteria that are pathogenic. Indicator bacteria can suggest the presence of pathogenic organisms that are found in warm-blooded animal or human waste, which poses a threat to the health of water bodies and the people who are exposed to the water bodies.

Based on regulatory drivers, water quality data, 303(d) listings, and public input, indicator bacteria have been identified as PWQCs for the water bodies within the Carlsbad WMA identified in Table 7.

#### **Toxicity**

Storm water runoff from urban areas can be a large source of pollutants or stressors to water bodies and can also result in toxicity to species (fish, invertebrates, echinoderms) within receiving water bodies. Toxicity testing is necessary to try to determine the cause of the toxicity.

Based on water quality data and 303(d) listings, (aquatic) toxicity has been identified as a PWQC for the water bodies within the Carlsbad WMA identified in Table 7.

#### **Sediment**

The process of sedimentation and siltation is due to the detachment, transport, and deposition of sediment particles by storm water and non-storm water runoff. While sediment is a natural and necessary part of a watershed, excessive sedimentation caused by anthropogenic activities can impair beneficial uses. Excessive sedimentation can result in reduced growth and survival rates of bottom-dwelling organisms, clogged fish gills, reduced biotic diversity, and cause an overall degradation to habitat.

Based on water quality data, 303(d) listings and public input, sediment has been identified as a PWQC for the water bodies within the Carlsbad WMA identified in Table 7.

#### **Hydromodification**

Hydromodification is defined in the Permit as “the change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, and groundwater flow) caused by

urbanization or other land use changes that result in increased stream flows and sediment transport.” In general, hydromodification is the change in the natural flow of water through an area of land. Changes in land cover (i.e. increased impervious surfaces and urbanization) can cause a change in runoff patterns by creating a system where rainfall runs into streams more quickly and with higher energy. Land use changes, in some cases, disrupts sediment loads, disturb natural flow patterns, alter stream or creek geometry and physical characteristics, and erode stream banks. These changes and disturbances impact the physical conditions in the receiving waters and can result in higher water temperatures, lower dissolved oxygen, degradation of aquatic habitat structure, loss of fish and other aquatic populations, and decreased water quality.

Hydromodification effects can be minimized through land-use planning, low impact development, and runoff controls. Preventative measures are typically more cost effective than remediation. RAs are addressing hydromodification impacts through the implementation of their Land Development requirements specified in the Permit. Remediation efforts to address hydromodification impacts can be taken when data and analysis has identified appropriate actions and tailored solutions for specific areas within a watershed or HA. Hydromodification impacts has been identified as a PWQC for Agua Hedionda Creek in Agua Hedionda HA based on public input and the specific analysis provided in the Agua Hedionda Watershed Management Plan (WMP) (Table 7). Further information is included in Section 3.3.1.

### Trash

Evidence from public input and local creek clean-up events<sup>5</sup> suggests that trash is a significant condition in the receiving waters. Additionally, on April 7, 2015 the State Water Board adopted an Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to Control Trash and Part 1 Trash Provision of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE Plan). Together they are collectively referred to as “the Trash Amendments” and will be referred to as such in the remainder of this WQIP. While trash assessments conducted during MS4 dry weather monitoring program implementation have not yielded indications of trash being a high priority issue in the Carlsbad WMA (MOE, 2011; Weston Solutions, 2012), the findings are based on limited locations where MS4 dry weather monitoring has occurred in the past.

The Carlsbad WQIP RAs have included trash as a PWQC throughout the entire Carlsbad WMA, based on the following factors: Public input; Clean-up event information; and Trash Amendments.

### Riparian Habitat

Riparian habitat is a critical component of a healthy watershed. Riparian areas typically occur as natural buffers between uplands and adjacent water bodies. Loss or degradation of these areas can result in more direct contribution of pollutants to the receiving waters. Healthy or restored riparian corridors help to: improve flood control; reduce erosion; stabilize riverbanks; increase habitat connectivity and quality; and improve water quality. Restoration of riparian habitats can improve water quality by allowing filtration of pollutants and stabilizing erosion and sedimentation processes through riverbank stabilization. The role of riparian areas in water quality improvement includes processing, removing, transforming, and storing such pollutants as sediment, nitrogen, phosphorous, and certain heavy metals (Washington State Department of Ecology, 1996).

Based on public input, consultation panel input, and information and data reviewed, such as the *Stormwater Monitoring Coalition’s Bioassessment of Perennial Streams in Southern California: A Report on the First Five years of the Stormwater Monitoring Coalition’s Regional Stream Survey (SMC Stream*

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<sup>5</sup> Carlsbad WMA Copermittee FY 2012 Jurisdictional Urban Runoff Management Plan Annual Reports and FY 2012 Carlsbad Watershed Urban Runoff Management Plan Annual Report

*Survey*), riparian habitat has been identified as a PWQC throughout the entire Carlsbad WMA. Furthermore, RAs are aware of several problem areas within their jurisdictions where loss or degradation has occurred and restoration of riparian habitat may result in significant improvements in water quality and protection of beneficial uses of the receiving waters.

Table 5: Summary of Receiving Water Data and Information											
Tributary Area		Loma Alta	Lower Buena Vista Creek	Upper Buena Vista Creek	Agua Hedionda (Lower Los Monos)	Agua Hedionda (Upper Los Monos)	Encinas	Lower San Marcos	Upper San Marcos	Lower Escondido Creek	Upper Escondido Creek
Hydrologic Area		904.1	904.21	904.22	904.31	904.31 & 904.32	904.4	904.51	904.52 & 904.53	904.61	904.62 & 904.63
Area (ac)		6,277	14,437		18,837		3,434	38,225		54,112	
Regulatory Drivers	BIOL Beneficial Use	Pacific Ocean	Buena Vista Lagoon Pacific Ocean		Agua Hedionda Lagoon Agua Hedionda Creek Pacific Ocean	Agua Hedionda Creek Santa Ysabel Creek	-	Batiquitos Lagoon Pacific Ocean	-	San Elijo Lagoon Escondido Creek Pacific Ocean	Escondido Creek
	Trash Amendments	Trash	Trash		Trash		Trash	Trash		Trash	
	TMDL	*Eutrophication	-		-		-	Bacteria		-	
	Voluntary Participation Agreement	-	-		-		-	-	**Nutrients	-	
	2010 303(d) Listed water bodies	Loma Alta Creek Selenium, Toxicity, Indicator Bacteria  Loma Alta Slough Eutrophic, Indicator Bacteria  Pacific Ocean Shoreline at Loma Alta Creek Mouth Indicator Bacteria	Buena Vista Lagoon Indicator Bacteria, Nutrients, Sedimentation/ Siltation	Buena Vista Creek Sediment Toxicity, Selenium	Agua Hedionda Creek Enterococcus, Fecal Coliform, Manganese, Phosphorus, Selenium, Total Dissolved Solids (TDS), Total Nitrogen as N, Toxicity  Buena Creek Dichlorodiphenyltrichloroethane(DDT), Nitrate		-	Cottonwood Creek DDT, Sediment Toxicity, Selenium  San Marcos Creek Dichlorodiphenyldichloroet hylene(DDE), Phosphorus, Sediment Toxicity, Selenium	San Marcos Creek DDE, Phosphorus, Sediment Toxicity, Selenium  San Marcos Lake Ammonia as N, Nutrients	Escondido Creek DDT, Enterococcus, Fecal Coliform, Manganese, Phosphate, Selenium, Sulfate, TDS, Total Nitrogen as N, Toxicity  San Elijo Lagoon Total Coliform, Eutrophic, Indicator Bacteria, Sedimentation/Siltation  Pacific Ocean Shoreline at San Elijo Lagoon Total Coliform	
Long Term Effectiveness Assessment (2005-2010)	Watershed Priority Constituents/ Conditions (WET)	Pesticides: <i>Bifenthrin</i> Bacteria: <i>Fecal Coliform</i> Solids: Total Suspended Solids( <i>TSS</i> ), <i>Turbidity</i>	Pesticides: <i>Bifenthrin</i> , <i>Permethrin</i> Bacteria: <i>Fecal Coliform</i> Solids: <i>TSS</i> , <i>Turbidity</i>		Pesticides: <i>Bifenthrin</i> Toxicity: <i>Hyalella azteca acute</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> Solids: <i>TSS</i> , <i>Turbidity</i>	Pesticides: <i>Chloropyrifos</i> Toxicity: <i>Hyalella azteca acute</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> Solids: <i>TSS</i> , <i>Turbidity</i>	-	-		Pesticides: <i>Bifenthrin</i> , <i>Cyfluthrin</i> , <i>Cypermethrin</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> Solids: <i>TSS</i> , <i>Turbidity</i>	Pesticides: <i>Bifenthrin</i> , <i>Diazinon</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> Solids: <i>TSS</i> , <i>Turbidity</i>
	Watershed Priority Constituents/ Conditions (DRY)	Toxicity: <i>C. dubia reproduction</i> , <i>Selenastrum acute</i> Nutrients: <i>Total Nitrogen</i> Biological: <i>Poor IBI</i> , <i>Observed-to-Expected ratio(O/E)</i> , <i>Benthic Algae</i> Bacteria: <i>Enterococci</i>	Nutrients: <i>Total Nitrogen</i> Biological: <i>Poor IBI</i> , <i>O/E</i> , <i>Benthic Algae</i> Bacteria: <i>Enterococci</i> Dissolved Minerals: <i>TDS</i>		Toxicity: <i>C. dubia repro</i> , <i>Selenas. acute</i> Nutrients: <i>Tot. Phosph</i> , <i>Nitrate as N</i> , <i>Tot. Nitrogen</i> Biological: <i>Poor IBI</i> , <i>O/E</i> , <i>Benthic Algae</i> Bacteria: <i>Enterococci</i> , <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> , <i>Chloride</i> , <i>Sulfate</i>	Toxicity: <i>Selenastrum acute</i> Nutrients: <i>Diss. Phosph</i> , <i>Tot. Phosph</i> , <i>Tot. Nitrogen</i> , <i>Nitrate as N</i> Biological: <i>Poor IBI</i> , <i>O/E</i> , <i>Benthic Algae</i> Bacteria: <i>Enterococci</i> , <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> , <i>Chloride</i> , <i>Sulfate</i>	-	-		Toxicity: <i>C. dubia reproduction</i> , <i>Selenastrum acute</i> Nutrients: <i>Total Nitrogen</i> , <i>Total Phosphorus</i> Biological: <i>Very Poor IBI</i> , <i>O/E</i> , <i>CRAM</i> , <i>Benthic Algae</i> Bacteria: <i>Enterococci</i> Dissolved Minerals: <i>TDS</i> , <i>Chloride</i> , <i>Sulfate</i>	Nutrients: <i>Total Nitrogen</i> Biological: <i>Poor IBI</i> , <i>O/E</i> , <i>Benthic Algae</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> , <i>Chloride</i> , <i>Sulfate</i> Chemical Oxygen Demand(COD)
Copermittee Regional Monitoring Program (2010-2011)	Priority Constituents/ Conditions (WET)	Pesticides: <i>Bifenthrin</i> Bacteria: <i>Fecal Coliform</i>	Pesticides: <i>Bifenthrin</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i>		Pesticides: <i>Bifenthrin</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i>		-	Pesticides: <i>Bifenthrin</i> Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i>		Bacteria: <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i>	
	Priority Constituents/ Conditions (DRY)	Toxicity: <i>C. dubia reproduction</i> , <i>C. dubia acute</i> , <i>C. dubia chronic</i> , <i>S. capricornutum acute</i> Nutrients: <i>Total Nitrogen</i> Biological: <i>Very Poor IBI</i> Bacteria: <i>Enterococcus</i>	Nutrients: <i>Nitrate</i> , <i>Total Nitrogen</i> , <i>Sulfate</i> Biological: <i>Very Poor IBI</i> Bacteria: <i>Enterococcus</i> , <i>E. coli</i> Dissolved Minerals: <i>TDS</i> Solids: <i>Turbidity</i>		Toxicity: <i>C. dubia reproduction</i> , <i>S. capricornutum acute</i> Nutrients: <i>Nitrate</i> , <i>Total Nitrogen</i> , <i>Total Phosphorus</i> , <i>Sulfate</i> Biological: <i>Very Poor IBI</i> Bacteria: <i>Enterococcus</i> , <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> , <i>Chloride</i> Metals: <i>Total Selenium</i> Pesticides: <i>Bifenthrin</i>		-	Toxicity: <i>C. dubia reproduction</i> , <i>S. capricornutum</i> Nutrients: <i>Total Nitrogen</i> , <i>Total Phosphorus</i> , <i>Dissolved Phosphorus</i> Biological: <i>Poor IBI</i> Bacteria: <i>Enterococcus</i> , <i>Fecal Coliform</i> Dissolved Minerals: <i>TDS</i> Solids: <i>TSS</i> , <i>Turbidity</i>		Toxicity: <i>C. dubia - acute, chronic, reproduction</i> , <i>S. capricornutum acute</i> Nutrients: <i>Total Nitrogen</i> , <i>Total Phosphorus</i> , <i>Dissolved Phosphorus</i> Biological: <i>Very Poor IBI</i> Bacteria: <i>Enterococcus</i> Dissolved Minerals: <i>TDS</i>	
Special Studies and Other Plans	-	Riparian Habitat	Riparian Habitat		Hydromodification and Riparian Habitat (Agua Hedionda Management Plan)		-	Nutrients (Upper San Marcos Creek Watershed Nutrient Investigation and Additional Monitoring Study; Riparian Habitat		Riparian Habitat	

\*RWQCB Resolution R9-2014-0020 adopted June 26, 2014 in lieu of TMDL

\*\*Participation Agreement Among the Lake San Marcos Workgroup - for more information see: <http://www.san-marcos.net/departments/development-services/stormwater/lake-san-marcos>.



Table 6: Summary of Receiving Water Data and Information (Results from Public Data Call)

Tributary Area		Loma Alta	Lower Buena Vista Creek		Upper Buena Vista Creek	Agua Hedionda	Encinas	Lower San Marcos	Upper San Marcos	Escondido Creek
Hydrologic Area		904.1	904.21		904.22	904.31 & 904.32	904.4	904.51	904.52 & 904.53	904.61
Information Received through Public Solicitation Process	Buena Vista Data Report	-	Sediment toxicity, selenium, indicator bacteria, nutrients, sedimentation/ siltation, low dissolved oxygen(DO)		-	-	-	-	-	-
	Revealing Escondido Creek	-	-		-	-	-	-	-	Sedimentation, Debris deposits
	Cottonwood Creek Report	-	-		-	-	-	Enterococcus bacteria, coliform bacteria, nutrients	-	-
	Carlsbad Watershed Network Letter	Bacteria and toxic materials Trash	Bacteria Trash and toxic materials		Bacteria and toxic materials Trash	-	-	Bacteria and toxic materials Trash	-	Bacteria and toxic materials Trash
	San Elijo Lagoon Conservancy Letter	Bacteria and toxic materials Trash	Bacteria Trash and toxic materials		Bacteria and toxic materials Trash	-	-	Bacteria and toxic materials Trash	-	Bacteria and toxic materials Trash
	Carlsbad Sanitary Sewer Survey	-	-		Bacteria, microbiological contaminants Turbidity	-	-	-	-	-
	San Diego Coastkeeper Data	-	Enterococcus and phosphorus		-	-	-	Enterococcus and phosphorus	-	Enterococcus and phosphorus
	3rd Party IBI Data		Very Poor		-	-	-			-
	3rd Party CRAM data	-	Fair to Good		-	-	-	-	-	-
	November 4, 2013 Public Workshop Input	Bacteria, pesticides, and nutrients, riparian habitat	Bacteria, pesticides, and nutrients; Hydromodification, riparian habitat		Bacteria, pesticides, and nutrients; riparian habitat	-	-	Bacteria, pesticides, and nutrients, sedimentation in Batiquitos lagoon; riparian habitat	Bacteria, pesticides, and nutrients	Bacteria, pesticides, and nutrients incl. phosphates Hydromodification; riparian habitat

Table 7: Priority Water Quality Conditions by Waterbody

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody	Assessment of Monitoring Data to Characterize Conditions
All water bodies within the Carlsbad WMA	All	All	Trash	All	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach	<ul style="list-style-type: none"><li>Public Input</li><li>Regulatory Driver – Trash Amendments</li></ul>
All water bodies within the Carlsbad WMA	All	All	Riparian Habitat	WARM;REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach	<ul style="list-style-type: none"><li>Public Input</li><li>RWQCB Input</li></ul>
Loma Alta Slough	Loma Alta Hydrologic Area	904.10	Eutrophic	Marine Habitat (MAR)	Dry Weather	Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Dry weather data supports nutrient contributions that may lead to eutrophic conditions</li><li>Annual Regional Monitoring: Dry Weather data supports nutrient contributions that may lead to eutrophic conditions</li><li>2010 303(d) Listing: No data specified to attribute to eutrophic condition</li><li>Source information: Specific source data is lacking at this time</li></ul>
Loma Alta Slough	Loma Alta Hydrologic Area	904.10	Indicator Bacteria	Contact Water Recreation (REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet and dry weather data supports indicator bacteria contributions</li><li>Annual Regional Monitoring: Wet and dry weather data supports indicator bacteria contributions</li><li>2010 303(d) Listing: No data specified to attribute to listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Loma Alta Creek	Loma Alta Hydrologic Area	904.10	Toxicity	Warm Freshwater Habitat (WARM);	Dry Weather	Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Dry weather data supports toxicity condition</li><li>Annual Regional Monitoring: Dry weather data supports toxicity conditions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time as to the source of pollutants that may be contributing to the toxicity conditions</li></ul>
Pacific Ocean Shoreline at Loma Alta Creek Mouth	Loma Alta Hydrologic Area	904.10	Indicator Bacteria	REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Data is not applicable to this location</li><li>2010 303(d) Listing: No data specified to attribute to listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Buena Vista Lagoon	Buena Vista Creek Hydrologic Area	904.21	Indicator Bacteria	REC-1	Dry and Wet Weather	Carlsbad, Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet and dry weather data supports indicator bacteria contributions</li><li>Annual Regional Monitoring: Wet and dry weather data supports indicator bacteria contributions</li><li>2010 303(d) Listing: No data specified to attribute to listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Buena Vista Lagoon	Buena Vista Creek Hydrologic Area	904.21	Sediment/Siltation	MAR	Not Applicable <sup>1</sup>	Carlsbad, Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet weather data supports contributions of TSS contributions</li><li>Annual Regional Monitoring: Data does not reflect contributions of TSS or sediment related pollutants</li><li>2010 303(d) Listing: No data specified to attribute to listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Buena Vista Lagoon	Buena Vista Creek Hydrologic Area	904.21	Nutrients	MAR	Dry Weather	Carlsbad, Oceanside, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Dry weather data supports nutrient contributions</li><li>Annual Regional Monitoring: Dry Weather data supports nutrient contributions</li><li>2010 303(d) Listing: No data specified to attribute to nutrients listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Indicator Bacteria	REC-1	Dry and Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet and dry weather data supports indicator bacteria contributions</li><li>Annual Regional Monitoring: Wet and dry weather data supports indicator bacteria contributions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Toxicity	WARM	Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet and dry weather data supports toxicity condition</li><li>Annual Regional Monitoring: Dry weather data supports toxicity conditions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time as to the source of pollutants that may be contributing to the toxicity conditions</li></ul>

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody	Assessment of Monitoring Data to Characterize Conditions
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Nutrients Category <sup>1</sup>	WARM	Dry and Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Dry weather data supports nutrient contributions</li><li>Annual Regional Monitoring: Dry Weather data supports nutrient contributions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Sediment - Erosion – Hydromodification	-	Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet weather data includes TSS which may be an indicator of hydromodification conditions</li><li>Annual Regional Monitoring: Data does not reflect contributions of TSS or sediment related pollutants</li><li>2010 303(d) Listing: Not listed on 303(d) listing</li><li>Source information: Historic (unmitigated) Increases in impervious surfaces in the tributary areas to locations where hydromodification impacts may be observed</li></ul>
Buena Creek	Agua Hedionda Hydrologic Area	904.30	Nitrate and Nitrite	Municipal & Domestic Water Supply (MUN)	Dry Weather	Vista, San Diego County	<ul style="list-style-type: none"><li>LTEA: Dry weather data supports Nitrate contributions</li><li>Annual Regional Monitoring: Dry Weather data supports Nitrate contributions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Pacific Ocean Shoreline at Moonlight Beach	San Marcos Hydrologic Area	904.50	Indicator Bacteria	REC-1	Dry and Wet Weather	Carlsbad, Encinitas, Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Available dry weather data at Moonlight Beach does not support indicator bacteria contributions; wet weather data is limited and no conclusions can be made</li><li>2010 303(d) Listing: Data summarized that supports listing for SHELL Beneficial Use, not REC-1 at Moonlight Beach</li><li>Source information: Specific source data is lacking at this time</li></ul>
San Marcos Creek - Lower	San Marcos Hydrologic Area	904.51	Nutrients <sup>1</sup>	WARM	Dry Weather	Carlsbad, Encinitas, Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Available dry weather supports Phosphorous contributions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Encinitas Creek	San Marcos Hydrologic Area	904.51	Toxicity	WARM	Dry Weather	Carlsbad, Encinitas	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Dry weather data supports toxicity conditions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time as to the source of pollutants that may be contributing to the toxicity conditions</li></ul>
San Marcos Lake <sup>2</sup>	San Marcos Hydrologic Area	904.52	Nutrients <sup>1</sup>	WARM	Dry and Wet Weather	Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Data is not available</li><li>Draft Remedial Investigation/Feasibility Study Report Upper San Marcos Creek and Lake San Marcos<sup>3</sup>: Available data supports Nutrient contributions.</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
San Marcos Creek- Upper	San Marcos Hydrologic Area	904.52 and 904.53	Nutrients <sup>1</sup>	WARM	Dry and Wet Weather	Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Available dry weather supports Phosphorous contributions</li><li>Draft Remedial Investigation/Feasibility Study Report Upper San Marcos Creek and Lake San Marcos<sup>3</sup>: Available data supports Nutrient contributions.</li><li>Lake San Marcos Mass Loading Study<sup>4</sup>: Available data supports Nutrient contributions.</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
San Marcos Creek- Upper below Via Vera Cruz	San Marcos Hydrologic Area	904.52 and 904.53	Indicator Bacteria	REC-1	Dry and Wet Weather	Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Data is not available</li><li>Annual Regional Monitoring: Available receiving water data and associated MS4 outfall sampling includes indicator bacteria exceedances. (2010-2012 Data).</li><li>2010 303(d) Listing: Not included in the 303(d) listing for the waterbody</li><li>Source information: Specific source data is lacking at this time</li></ul>
Escondido Creek	Escondido Creek Hydrologic Area	904.60	Indicator Bacteria	REC-1	Wet Weather	Encinitas, Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Wet and dry weather data supports indicator bacteria contributions</li><li>Annual Regional Monitoring: Wet and dry weather data supports indicator bacteria contributions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time</li></ul>
Escondido Creek	Escondido Creek Hydrologic Area	904.60	Toxicity	WARM	Dry Weather	Encinitas, Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>LTEA: Dry weather data supports toxicity condition</li><li>Annual Regional Monitoring: Dry weather data supports toxicity conditions</li><li>2010 303(d) Listing: Data summarized that supports listing</li><li>Source information: Specific source data is lacking at this time as to the source of pollutants that may be contributing to the toxicity conditions</li></ul>

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody	Assessment of Monitoring Data to Characterize Conditions
Escondido Creek	Escondido Creek Hydrologic Area	904.60	Nutrients Category <sup>1</sup>	WARM	Dry and Wet Weather	Encinitas, Escondido, San Marcos, San Diego County	<ul style="list-style-type: none"><li>• LTEA: Dry weather data supports nutrient contributions</li><li>• Annual Regional Monitoring: Dry Weather data supports nutrient contributions</li><li>• 2010 303(d) Listing: Data summarized that supports listing</li><li>• Source information: Specific source data is lacking at this time</li></ul>
San Elijo Lagoon	Escondido Creek Hydrologic Area	904.61	Indicator Bacteria	REC-1	Dry Weather	Encinitas, Escondido, San Marcos, Solana Beach, San Diego County	<ul style="list-style-type: none"><li>• LTEA: Wet and dry weather data supports indicator bacteria contributions</li><li>• Annual Regional Monitoring: Wet and dry weather data supports indicator bacteria contributions</li><li>• 2010 303(d) Listing: Data summarized that supports listing for SHELL Beneficial Use, not REC-1</li><li>• Source information: Specific source data is lacking at this time</li></ul>
San Elijo Lagoon	Escondido Creek Hydrologic Area	904.61	Sediment/Siltation	WARM	Not Applicable <sup>2</sup>	Encinitas, Escondido, San Marcos, Solana Beach, San Diego County	<ul style="list-style-type: none"><li>• LTEA: Wet weather data supports contributions of TSS contributions</li><li>• Annual Regional Monitoring: Data does not reflect contributions of TSS or sediment related pollutants</li><li>• 2010 303(d) Listing: No data specified to attribute to listing</li><li>• Source information: Specific source data is lacking at this time</li></ul>
San Elijo Lagoon	Escondido Creek Hydrologic Area	904.61	Eutrophic	WARM	Dry Weather	Encinitas, Escondido, San Marcos, Solana Beach, San Diego County	<ul style="list-style-type: none"><li>• LTEA: Dry weather data supports nutrient contributions that may lead to eutrophic conditions</li><li>• Annual Regional Monitoring: Dry Weather data supports nutrient contributions that may lead to eutrophic conditions</li><li>• 2010 303(d) Listing: No data specified to attribute to eutrophic condition</li><li>• Source information: Specific source data is lacking at this time</li></ul>

<sup>1</sup>Based on 2011 LTEA, nutrients category includes at least two or more of the following pollutants: Dissolved Phosphorous; Orthophosphate; Total Phosphorous; Total Kjedahl Nitrogen; Total Nitrogen; Eutrophication; or Benthic Algae

<sup>2</sup>San Marcos Lake is privately owned by the Citizens Development Corporation.

<sup>3</sup>Draft Remedial Investigation/Feasibility Study Report Upper San Marcos Creek Watershed and Lake San Marcos, January 2016 ([http://geotracker.waterboards.ca.gov/esi/uploads/geo\\_report/1140478551/T10000003261.PDF](http://geotracker.waterboards.ca.gov/esi/uploads/geo_report/1140478551/T10000003261.PDF))

<sup>4</sup>Lake San Marcos Mass Loading Station Study, County of San Diego, 2012.

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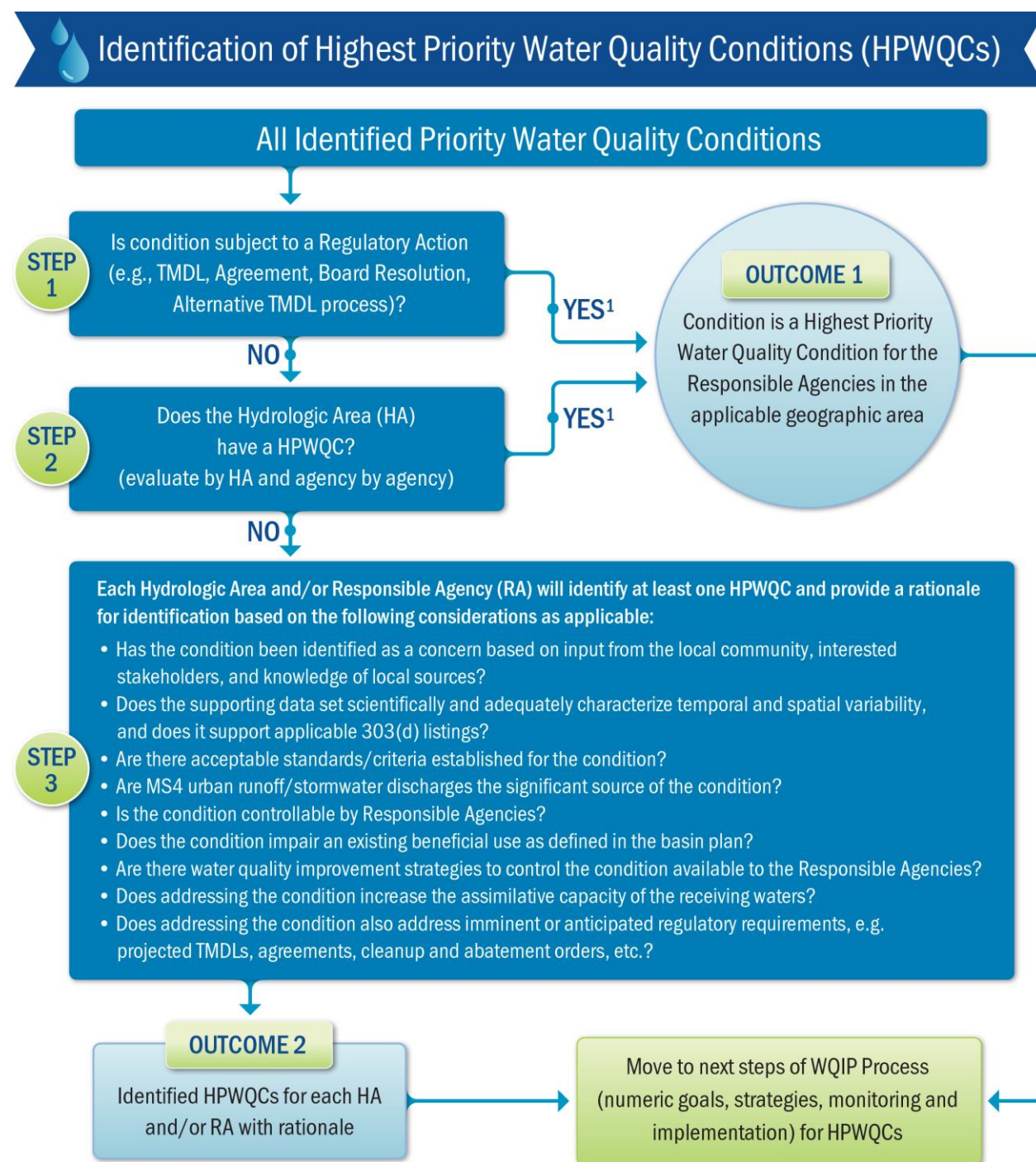
### 2.1.2 Identification of Highest Priority Water Quality Conditions

The process the RAs developed for evaluating the PWQCs and selecting those that are justifiably the highest PWQCs is robust as the implications of HPWQCs are significant; each HPWQC will have corresponding numeric goals and schedules and resulting strategies to achieve its goals. The RAs identified a comprehensive approach in selecting the HPWQCs in each HA or HSA. The process includes evaluating available HA-specific data and information, reviewing regulatory drivers, and considering public input. The process for HPWQC identification is depicted as a flow chart in Figure 7 and is described below.

The first step of the HPWQC selection process was to determine whether the condition is subject to a regulatory action. Regulatory actions include, but are not limited to: San Diego Water Board (or Environmental Protection Agency (EPA)) adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements. In general, regulatory actions are taken when a water quality condition is significantly impacting a receiving water's beneficial use and has been prioritized as a high threat to water quality by regulatory agencies. There is typically robust data and analysis incorporated into the regulatory action process; therefore, water quality conditions identified through regulatory actions take precedence and warrant the establishment of specific requirements to address the conditions. A significant amount of time and resources will be required to implement programs and strategies to meet the requirements of regulatory actions.

The next step of the HPWQC selection process was to review and determine whether each HA and/or RA had a HPWQC after the first step. If after the first step, an HA did not have a HPWQC, then each HA or RA selected at least one HPWQC and provided a rationale for identification based on the following considerations, as applicable:

- Has the condition been identified as a concern based on input from the local community, interested stakeholders, and knowledge of local sources?
- Does the supporting data set scientifically and adequately characterize temporal and spatial variability, and does it support applicable 303(d) listings?
- Are there acceptable standards/criteria established for the condition?
- Are MS4 urban runoff/storm water discharges the significant source of the condition?
- Is the condition controllable by RAs?
- Does the condition impair an existing beneficial use as defined in the basin plan?
- Are there water quality improvement strategies to control the condition available to the RAs?
- Does addressing the condition increase the assimilative capacity of the receiving waters?
- Does addressing the condition also address imminent or anticipated regulatory requirements, e.g., projected TMDLs, agreements, cleanup and abatement orders, etc.?



#### Notes

- Public input was collected and incorporated into the process to aid in identifying priorities.
- Storm water managers use Best Professional Judgment (BPJ) to aid in the prioritization of conditions, programs and projects.
- Each Priority Water Quality Condition is assessed using this process to identify Highest Priority Water Quality Conditions.
- HAs are evaluated for HPWQCs through this process, and all Responsible Agencies within each HA work cooperatively to implement strategies that benefit HPWQCs and PWQCs to ensure a collaborative effort and holistic watershed approach.

<sup>1</sup> If applicable, RAs have the discretion to identify more than one Highest Priority Water Quality Condition and can choose to move to Step 3 for identification.

**Figure 7: Process for Highest Priority Water Quality Condition Selection**

Table 8 provides a summary of the HPWQCs for the Carlsbad WMA WQIP. The HPWQCs and rationale for selection is included in each of the Hydrologic Area sections in Section 3 of this WQIP.

**Table 8: Highest Priority Water Quality Conditions by Hydrologic Area**

Hydrologic Area	Applicable Receiving Water*	Highest Priority Water Quality Condition (Condition, Pollutant, or Stressor)	Temporal Extent	Location of HPWQC Selection Rationale
Loma Alta	Loma Alta Slough	Eutrophic (nutrients)	Between May and October	Section 3.1.1
Buena Vista	Buena Vista Lagoon	Priority Water Quality Conditions addressed and strategies implemented	Not Applicable	Not Applicable – See Section 3.2.1 for more information
Agua Hedionda	Agua Hedionda Creek	Riparian Habitat Degradation	Dry and Wet Weather	Section 3.3.1
		Hydromodification Impacts	Dry and Wet Weather	Section 3.3.1
Encinas	Pacific Ocean	Strategies implemented	Not Applicable	Not Applicable – See Section 3.4.1, for more information
San Marcos	Lower – Pacific Ocean Shoreline at Moonlight Beach	Bacteria	Dry and Wet Weather	Section 3.5.1
	Upper – San Marcos Creek	Nutrients	Dry and Wet Weather	Section 3.5.1
Escondido	Escondido Creek	Riparian Habitat Degradation	Dry and Wet Weather	Section 3.6.1

\*While HPWQCs may not be selected for every receiving water, strategies addressing applicable HPWQCs and PWQCs are being implemented throughout the watershed and are included in each HA Section in Section 3 of this WQIP.

## 2.2 Municipal Separate Storm Sewer Systems (MS4) Sources

RAs own and operate Municipal Separate Storm Sewer Systems (MS4s). MS4s consist of municipal streets, curbs, gutters, ditches, man-made channels, inlets, basins, storm drain pipes and appurtenant conveyance systems. MS4 represents the entire conveyance system that RAs own, operate and maintain.

Permit Provision B.2.d requires the RAs to identify and prioritize known and suspected sources of storm water and non-storm water pollutants and/or other stressors associated with MS4 discharges that cause or contribute to the HPWQCs. The RAs reviewed the following items when considering potential MS4 sources associated with the selected HPWQCs:

- Pollutant generating facilities, areas, and/or activities within the WMA
- Locations of the RAs MS4s
- Other known and suspected sources of non-storm water or pollutants in storm water discharges to receiving water within the WMA (i.e., wildlife, other NPDES permitted discharges, etc.)
- Review of available data including
  - IDDE Program findings
  - Outfall monitoring findings and assessments
  - Receiving water monitoring findings and assessments
- Adequacy of available data to identify and prioritize sources and/or stressors associated with MS4 discharges that cause or contribute to the HPWQCs

The RAs used the informational resources in Table 3 and 4 to identify and prioritize MS4 sources along with information received through the Carlsbad WQIP consultation panel and public input.

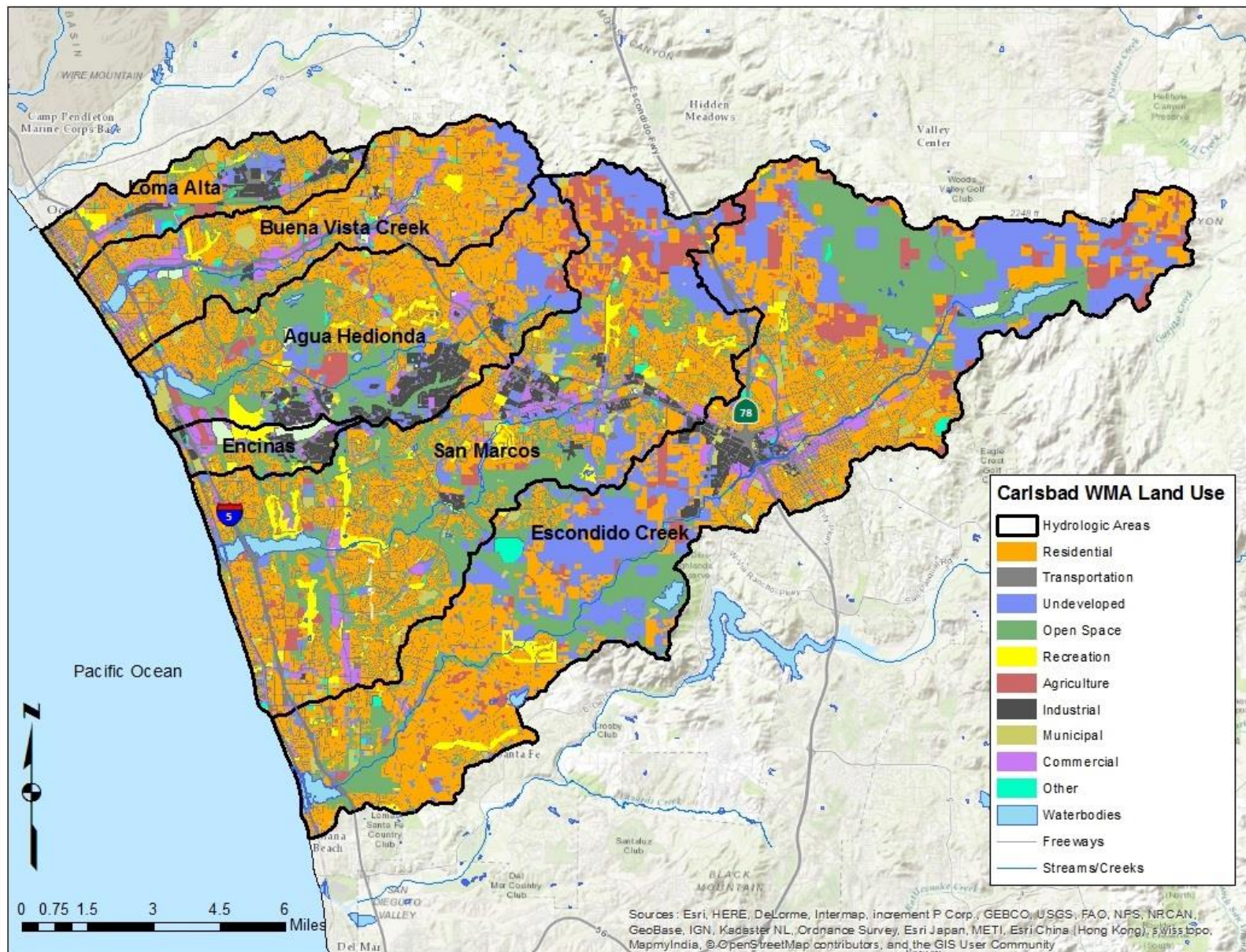
The pollutants found in wet weather urban runoff are generally associated with land uses in the tributary areas. Rainfall runoff mobilizes and transports pollutants from areas that are collectively associated with particular land uses. This is opposed to the pollutants found in dry weather urban runoff that are generally associated with identifiable-source discharges such as residences, construction sites, or commercial facilities. Figure 8 presents the land use in the Carlsbad WMA, and Figure 9 and Table 9 summarize the land use in each of the HAs.

Urbanized areas with impervious surfaces are a known source that can increase the variety and amount of pollutants that have the potential to enter the MS4 and receiving waters. Impervious surfaces do not allow storm water to infiltrate into the ground which can greatly increase the volume and velocity of storm water runoff causing hydromodification and habitat degradation impacts. In addition, land uses such as agriculture, commercial, and residential can greatly influence the nutrient and indicator bacteria levels entering the receiving waters. RAs will focus their wet weather strategies on land uses within the HA that cause or contribute to the HPWQCs.

Dry weather urban runoff pollutants are typically generated from pollutant generating activities conducted by specific source locations and are conveyed to the MS4 through illicit discharges, over-irrigation, groundwater infiltration, or permitted discharges. Section 3 provides the HA-specific dry weather source information for the selected HPWQCs.

Strategies and associated sources for both wet weather and dry weather are summarized in Section 3.





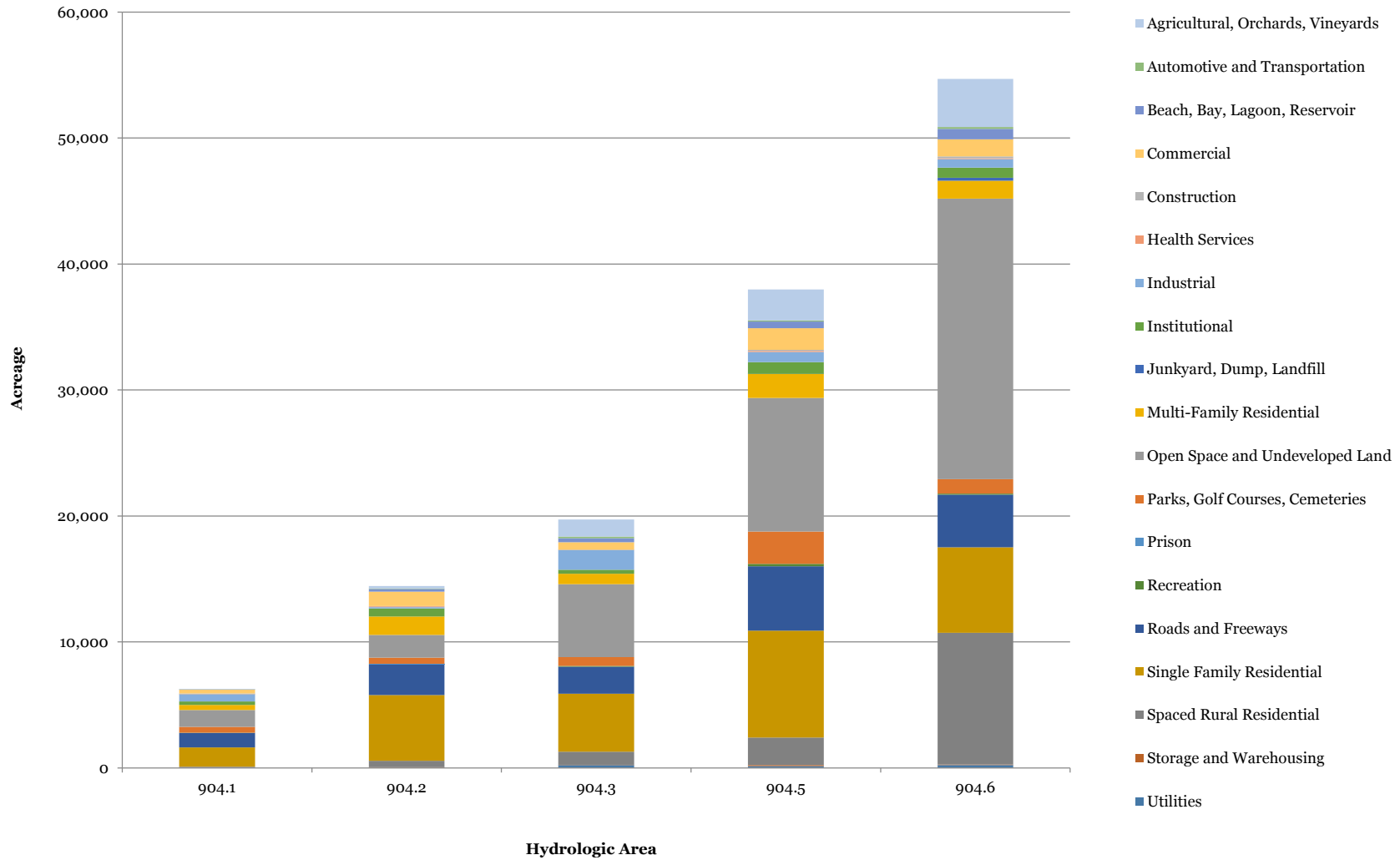
**Figure 8: Carlsbad WMA Land Use Map**



**Table 9: Land Use Acreage by Hydrologic Area**

Land Use	Hydrologic Area (acres)					
	Loma Alta (904.1)	Buena Vista (904.2)	Agua Hedionda (904.3)	Encinas (904.4)	San Marcos (904.5)	Escondido Creek (904.6)
Agricultural, Orchards, Vineyards	51.5	183.2	1,358.2	55.0	2,463.2	3,835.0
Automotive and Transportation	9.3	40.3	134.8	202.7	96.8	131.6
Beach, Bay, Lagoon, Reservoir	13.4	222.1	319.3	1.3	520.0	830.8
Commercial	298.1	1,139.8	590.4	274.9	1,715.5	1,355.8
Construction	70.7	23.7	35.7	6.1	91.5	157.8
Health Services	5.7	67.4	11.8	1.3	85.4	58.9
Industrial	557.2	97.9	1,533.7	413.0	814.2	683.1
Institutional	273.2	629.4	320.6	28.2	929.9	798.1
Junkyard, Dump, Landfill	0.0	0.0	0.0	0.0	3.1	238.3
Multi-Family Residential	405.2	1,474.5	836.1	109.8	1,896.5	1,425.9
Open Space/Undeveloped Land	1,339.4	1,805.7	5,786.7	441.9	10,606.0	22,264.5
Parks, Golf Courses, Cemeteries	465.0	477.0	702.8	247.0	2,560.5	1,152.6
Prison	0.0	24.2	0.0	0.0	0.0	0.0
Recreation	11.3	54.3	64.6	138.7	207.3	77.0
Roads, Freeways, Railways	1,152.7	2,416.1	2,133.1	356.8	5,094.8	4,182.3
Single Family Residential	1,514.5	5,213.9	4,602.5	155.6	8,484.1	6,777.5
Spaced Rural Residential	44.3	510.5	1,038.0	0.0	2,192.0	10,461.9
Storage and Warehousing	37.3	35.7	29.0	21.7	86.5	49.9
Utilities	26.7	14.0	221.7	35.6	139.8	219.7

## Carlsbad WMA Water Quality Improvement Plan



Note: HA 904.4 is not shown graphically due to the small overall area. For a land use representation of HA 904.4, please see above.  
Source: SANDAG, 2009

**Figure 9: Carlsbad WMA Land Use (acreage) by Hydrologic Area**

## 2.3 Goals and Schedules

Identifying goals and the means to achieve them is a fundamental component of the Carlsbad WMA. Goals define realistic water quality improvement outcomes and also provide direction and purpose to program planning in this context. The overarching goals of the WQIP include: protecting human health; effectively prohibiting non-storm water discharges to the RAs' storm drain systems; reducing pollutants in storm water discharges from the RAs' storm drain systems; and protecting water quality standards of the receiving waters.

Interim goals are intended to establish check-points along the path towards achieving final numeric goals. Based on the programmatic efforts of the RAs and the HPWQCs, goals were identified as benchmarks for program performance. Interim goals for each five-year period from WQIP approval to the anticipated final goal achievement date (including an interim goal for the current permit term), have also been developed. The forthcoming Monitoring and Assessment Program will describe the mechanisms for using the interim goals to measure progress and adapt program strategies, goals and schedules.

Final numeric goals identified by the RAs provide an end-point that marks achievement of desired water quality improvements or outcomes. As the final goals are achieved, RAs will adapt their programs to maintain the status of the conditions they have achieved and reevaluate the priorities within each HA.

In developing initial goal schedules, the RAs considered the following:

- Priority conditions within their jurisdictional portions of the WMA
- Potential sources of pollutants and/or stressors contributing to priority conditions
- Known effectiveness and efficiencies of strategies
- Resources and the funding required to implement strategies
- Balancing resources for competing priority areas throughout each RAs jurisdictional boundary – within a HA, across multiple HAs or WMAs.

RAs developed goals both collaboratively and individually to best address the sources and stressors within the HAs. In some cases, goals were established for the entire HA and in other cases goals were established for specific areas within the HA.

Interim and final goals included in the Carlsbad WQIP also have associated schedules for the achievement of the goals. For HPWQCs subject to a TMDL or other regulatory mechanism, the compliance schedule is reflected in the interim and final goals presented in the respective HAs. For other HPWQCs, the schedules for interim and final goals reflect a realistic assessment of the shortest practicable time required to achieve the goals and reasonably implement the water quality improvement strategies based on the temporal/spatial extent and other factors associated with the HPWQCs identified.

Based on the data that is available at this time, there are unknowns related to establishing goals and associated schedules, including: baseline MS4 discharge conditions; site-specific source pollutant contributions; and strategy effectiveness. Based on these uncertainties and as more data becomes available through implementation, monitoring, or special studies, the initial established goals and schedules are expected to be dynamic. In September 2015, RWQCB staff and RA staff discussed numeric goals. During the collaborative discussion, it was confirmed that, unless there is a TMDL, numeric goals are a target the RAs are trying to achieve and are not compliance points. Therefore, as the RAs establish baseline conditions, implement strategies and analyze assessment data, it is expected that the goals and schedules will change through an iterative and adaptive management process.

Identified goals are included in each of the HA sections in Section 3 of this WQIP.

## 2.4 Strategies

Strategies are identified and implemented as a part of the approach to improve water quality conditions in MS4 discharges and receiving waters. The term *strategies* in the WQIP includes:

- Planning efforts
- Structural BMPs
- Program BMPs and/or core jurisdictional program strategies
- Requiring BMPs of regulated entities, and
- Incentives.

Identified strategies for implementation are intended to achieve the following objectives:

- 1) Effectively prohibit non-storm water discharges to the MS4;
- 2) Reduce pollutants in storm water discharges from the MS4 to the MEP;
- 3) Protect the beneficial uses of receiving waters from MS4 discharges; and/or
- 4) Achieve the interim and final numeric goals identified by the RAs.

Further details on objectives include identification and implementation of effective strategies that improve or enhance the natural beneficial watershed features:

- 1) Wetlands, e.g., protection, creation or restoration of wetland areas
- 2) Riparian habitat, e.g., protection, creation or restoration of riparian habitat
- 3) Upland Vegetation, e.g., protection, creation or restoration of upland habitat
- 4) Connectivity, e.g., removal of concrete lined channels or bypass of waters past an obstruction

The Carlsbad WQIP categorizes three types of strategies: jurisdictional strategies; optional strategies; and WMA strategies. Core jurisdictional program strategies are the strategies implemented within each RA's jurisdiction as part of its jurisdictional runoff management program requirements under Permit Provisions E.2 through E.7. Optional strategies are BMPs, incentives, or programs that may be implemented by the RA within its jurisdiction. WMA strategies are optional regional, or multi-jurisdictional BMPs, incentives, or programs that may be implemented in the Carlsbad WMA. Moreover, there are two types of optional strategies: those that are planned for implementation (planned optional strategies) and those that are established along with criteria that would trigger their implementation (triggered optional strategies).

Planned optional strategies do not include the additional criteria, that if met, would trigger the strategies, as RAs have already committed to implementing them and have secured funding and resources. It is important to note that RAs have in many cases enhanced (i.e., gone above the minimum requirements in E.2 through E.7) their jurisdictional strategies to target specific areas or sources that are causing or contributing to the HPWQC, or PWQCs in the Carlsbad WMA. The minimum BMPs and inspection frequencies for areas or sources within the Carlsbad WMA can be found in each RA's JRMP and are also summarized in Appendices B and C respectively.

As part of the June 2014 B.2 Report, a list of potential strategies (nonstructural and structural) was developed by the RAs based on public input, previous JRMP and WURMP activities and effectiveness assessment results, enhancements to JRMP activities, and additional strategies anticipated to be effective at addressing PWQC. The June 2014 B.2 Report is posted on the Project Clean Water website ([www.projectcleanwater.org](http://www.projectcleanwater.org)). This list was used as a guide by RAs to identify strategies appropriate for their jurisdictions. From the potential strategies identified in the June 2014 B.2 Report, the RAs identified strategies to implement through their JRMPs. The combination of strategies has been identified to achieve one or more of the objectives listed above.

The remainder of this sub-section (2.4 Strategies) describes:

- Considerations that the RAs evaluated during the process of identifying those strategies that are expected to achieve the goals identified and the objectives identified above.
- General descriptions of identified strategies to be implemented that are expected to achieve the goals identified and the objectives identified above
- Descriptions of optional and watershed management area strategies.

Specific strategies for implementation are presented in the HA sections in Section 3 of this WQIP.

#### 2.4.1 Geographic Characteristics and Prioritization

Although topographic features define watershed areas, characteristics of watershed areas have direct influence on non-storm water discharges and pollutants in storm water discharges, and ultimately the water quality conditions in receiving waters. The Carlsbad WMA RAs considered the following characteristics when identifying and developing strategies to improve their water quality:

- Population Demographics
- Infrastructure
- Land Uses
- Potential Pollutant Sources – types and characteristics
- Pollutant Generating Activities
- Soil Conditions
- Receiving Water Types and Features

In the Carlsbad WMA there are six hydrologically disconnected HAs with distinct creek systems that drain to separate watershed outlets, which led the RAs to identify PWQCs and associated strategies specific to the HA.

The 2013 Permit states that, “*where appropriate, Watershed Management Areas may be separated into subwatersheds to focus water quality prioritization and jurisdictional runoff management program implementation efforts by receiving water*” (RWQCB, 2013). This represents a paradigm shift from previous permits where RAs implemented the same activities throughout their jurisdictions. The 2013 Permit allows jurisdictions to prioritize and focus program efforts based on geographic area characteristics, leading to more effective and efficient implementation of strategies to address priority conditions.

RAs may consider the following information when using the geographic prioritization approach. This list is not exclusive and includes examples of relevant information used in the prioritization processes.

- Balancing resources for competing priority areas throughout each RAs jurisdictional boundary – within a hydrologic area or across multiple HAs or WMAs.
- Historical issues with specific sources, manifested in terms of discharges, enforcement or poor BMP implementation may be an indicator of pollutant discharge sources that can be eliminated.
- Persistently flowing outfalls within specific areas may be caused by unauthorized non-storm water discharges.
- Historical monitoring data may show areas of concern where pollutant concentrations may be above action levels and can indicate source contributors that need abatement.
- Historic (unmitigated) increases in impervious surfaces in the tributary areas to locations where hydromodification impacts may be documented.
- Older areas that may not have been subject to MS4 permit requirements at the time of design or construction.



- Areas with existing Treatment Control BMPs may be less of a focus because it is implied that there is adequate treatment for dry weather runoff and smaller wet weather events.
- Housing developments with relatively large amounts of turf or vegetated areas (common areas, yards, vegetated slopes, etc.) may have higher rates of irrigation runoff than other areas.
- Multi-Family Residential areas have a relatively high intensity of use, for example, there are more vehicles, parking areas and more litter. These areas usually have shared trash areas and common landscaped areas. The higher concentration of people can create a higher concentration of trash and pollutants with the potential to contact storm water and non-storm water runoff and enter the MS4.
- Industrial and Commercial Facilities have a variety of businesses and wastes creating different types of possible discharges. Some facilities may have areas outside where chemicals or wastes are stored, creating the potential for pollutants to be washed away into the MS4 during rain events.
- Municipal Properties may include open areas, parks or street medians. These areas may require irrigation, creating the potential for irrigation runoff.
- Ability to effectively measure progress towards established goals, e.g., safe and accessible monitoring locations.
- Amount and distribution of natural open space within each HA.

RAs considered a combination of criteria during the final strategy identification process. The following is an example listing of some criteria the RAs considered:

- Preference to strategies that target HPWQCs, and those that provide multiple benefits, e.g., benefitting PWQCs, as well as other pollutants
- Geographic focus areas, e.g., land-use, physical characteristics, demographics
- Anticipated effectiveness at addressing sources that may be impacting HPWQCs and PWQCs
- Anticipated social impacts, e.g., strategies that require perceived inconveniences to the general public may not be effective due to lack of participation
- Balancing resources for competing priority areas throughout each RAs jurisdictional boundary – within a hydrologic area or across multiple hydrologic areas or watershed management areas

The RAs evaluated their existing programs, the potential for incorporating enhancements and new administrative programs, and the types of structural BMPs that may be considered, if warranted and appropriate for the jurisdiction. All aspects of their JRMPs were evaluated, which provided the necessary baseline for existing nonstructural solutions and suggested areas where enhanced or restructured activities might be more successful.

Funding for identified strategies may affect the timeline for the development and initiation of the plan. The proposed schedules reflect the anticipated time needed and a staggered approach for strategy implementation to accommodate uncertainties. At this stage of the WQIP process, the strategies list may not reflect all strategies that are currently being implemented by RAs or other entities. However, the list does include most strategies that jurisdictions are currently focusing their efforts and own resources.

Note that the suite of strategies (i.e., jurisdictional strategies, optional strategies, and other water quality improvement strategies) that will be implemented are generally not pollutant-specific. Therefore, the collective strategies are expected to have positive impacts on multiple PWQCs identified, in addition to HPWQCs

Similar to the goals, in the early stages of the WQIP process, the identified strategies and schedules are expected to be dynamic. Moreover, as the RAs implement the strategies and assess data, it is expected that strategies and schedules will change through an iterative and adaptive management process. These changes will be presented in future WQIP reports and updates.

#### 2.4.2 Planned Jurisdictional Strategies

Planned jurisdictional strategies include jurisdictional programs to address the requirements of Permit Provisions E.2. through E.7. These strategies form the core of implemented strategies intended to meet the objectives listed in Section 2.4 above.

While these strategies will be implemented in each HA, some HAs have additional planned jurisdictional strategies to supplement these core jurisdictional strategies based on their individual goals and associated HPWQCs (see Section 3). The core jurisdictional program strategies include the following and are described in more detail below:

- Administrative BMPs
- Investigations
- Development and Redevelopment Requirements
- Inspections
- MS4 Inspections/Cleaning
- Street Sweeping
- General Education and Outreach
- Employee Training
- Enforcement
- Partnership Program(s)
- Programs for Retrofitting Areas of Existing Development
- Program for Stream, Channel and/or Existing Habitat Rehabilitation in Areas of Existing Development
- Offsite Alternative Compliance

##### 2.4.2.1 Administrative BMPs

Administrative BMPs are essential core strategies for implementation. Program administration is fundamental in achieving effective outcomes, and confirmation is often used to track plan implementation. Administrative BMP activities include:

- 1) Review/update source inventories and priorities (Storm Water Pollutant Control BMPs, construction, industrial and commercial, municipal, and residential)
- 2) Establishing/review/update BMP requirements and development BMP design requirements
- 3) Develop/review/update standard operating procedures (SOPs), Storm Water Pollution Prevention Plans (SWPPPs), Storm Water Management Plans (SWMPs), manuals, enforcement procedures, etc.
- 4) Review/update General Plans,
- 5) Review/update ordinances, municipal code, etc.
- 6) Maintain appropriate contracts for BMP operation and maintenance
- 7) Review/update educational materials
- 8) Review/update approval process
- 9) Establish and maintain adequate legal authority

These activities are important for establishing the foundation of a storm water program, and are key for obtaining compliance with the requirements of the JRMPs.

Administrative BMPs include establishing BMP requirements. In many cases, this means developing Activity BMPs for implementation by target audiences. Activity BMPs include: cover, contain, prevent discharges, (good housekeeping) and administrative BMPs. Some examples of activity BMPs include:

- 1) Covering activity/material
- 2) Clean floor mats, etc. indoors

- 3) Washing vehicles and equipment in designated areas
- 4) Properly managing pesticide/fertilizer use
- 5) Protecting storm drains
- 6) Cleaning up regularly with dry methods
- 7) Developing and implementing spill prevention plans.

Minimum Activity BMPs may vary between RAs (due to each jurisdiction's requirements), but each jurisdiction strives to require and enforce all minimum BMPs for the appropriate source. Jurisdiction-specific Minimum Activity BMPs for municipal, industrial and commercial, construction, and residential areas and activities are included in each JRMP.

The requirement and enforcement of Activity BMPs is a facilitation activity by the RAs that, when implemented by the target audience, can assist in achieving behavior change and in some cases load reductions.

#### *2.4.2.2 Investigations*

Investigations are conducted to identify illegal discharges and illicit connections as a result of public reporting (hotlines, websites, etc.), inspection findings, staff referrals, and/or monitoring results. Investigations may include visual observations, closed circuit television (CCTV) pipeline inspections often used for the MS4, or additional monitoring. Investigations can occur in municipal, land development, construction, industrial, commercial, or residential areas. Investigations may also address a wide range of pollutants and pollutant-generating activities based upon the type of illegal discharge, illicit connection, or possibly natural source discovered. The purpose of investigations is to identify and eliminate any illegal discharges or illicit connections to the MS4. Typical illegal discharges identified through investigations include:

- 1) Motor oil or antifreeze from automobiles
- 2) Sanitary wastewater
- 3) Runoff from excess irrigation
- 4) Household toxic substances
- 5) Sediment
- 6) Trash

Investigations are a common tool used to respond to reports of potential violations, and this data gathering activity can be effective in finding and eliminating illegal discharges and illicit connections. The detection and elimination of illegal discharges and illicit connections can result in load reductions.

#### *2.4.2.3 Development and Redevelopment Requirements*

Development and redevelopment project proponents submit project applications to the RAs to obtain permits to construct their projects. In general, project types include those that have ground disturbing activities and create or replace impervious surfaces. As required by the Permit, RAs, through their administrative BMPs, have established specific design requirements for development and redevelopment projects to incorporate low impact development (LID), source control, pollutant control and hydromodification management BMPs into the project design.

In general, RAs use their land development processes as the mechanism to determine a project's development priority and place conditions on projects to fulfill the water quality and hydromodification related project requirements. Project proponents submit their plans and reports to demonstrate compliance with the RAs requirements, such as a 401 Water Quality Certification in the event an applicant

proposes to dredge or fill waters of the United States<sup>6</sup>. Those plans and reports are then reviewed and evaluated for accuracy and compliance with the requirements of the Permit.

The implementation and enforcement of development and redevelopment requirements is an effective BMP because it mitigates for potential water quality or hydromodification impacts from development land-use. Furthermore, as redevelopment continues to occur, previously unmitigated existing land uses will have controls in place as required by the Permit that alleviate impacts to water quality or hydromodification impacts from historical land uses (i.e., impervious areas).

#### 2.4.2.4 Inspections

Inspections are conducted to examine facilities or sites for storm water requirements and BMP implementation and are often used as an opportunity to educate facility operators or owners regarding storm water and BMPs. Typically, inspections consist of two primary components: a visual/observational assessment of the conditions and operations at facility or site; and, verbal interviewing of the facility or site representative. The purpose of the inspections is to identify issues or potential issues and initiate a course of action to correct identified issues. Typical issues include:

- 1) Active discharges
- 2) Presence of evidence identifying previous discharges
- 3) Required BMPs not implemented
- 4) Lack of required documentation or paperwork
- 5) Required operation and maintenance not conducted

As part of the inspection program inventories for facilities, residential management areas and other activities and areas are maintained and prioritized. In general, an inspection frequency is determined based upon priority, and inspection and enforcement information, along with any applicable follow-up, is retained in a database.

There are a variety of inspection types used to complete inspections including:

- 1) Conventional inspections that include interviews with onsite personnel, as available
- 2) Drive-by inspections
- 3) Property-based inspections
- 4) Patrol inspections

When inspections are conducted, either by Municipal staff or contracted staff, the inspector typically has a checklist or inspection form that is used to assist in determining compliance. Some of the items inspectors will look for during inspections are included below.

#### Development Planning:

- Verifying effective operation and maintenance of Structural BMPs as required by the Permit
- Verifying Storm Water Pollutant Control BMPs compliance with all ordinances, permits, codes, etc.
- Prior to occupancy of each Priority Development Project subject to BMP Design Manual requirements, verifying that the constructed low impact development (LID), source control, and Storm Water Pollutant Control BMPs have been constructed in compliance with all specifications, plans, permits, ordinances, etc.

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<sup>6</sup> Order No. R9-2013-0001, as amended, Section E.3.a.(3)(a), footnote 25

Construction Sites:

- Check for coverage under the General Construction Permit (Notice of Intent (NOI) and/or Waste Discharge Identification Number) during initial inspections;
- Assessment of Compliance with Permittee ordinances and permits related to urban runoff, including the implementation and maintenance of designated minimum BMPs;
- Assessment of BMP effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff;
- Education and outreach on storm water pollution prevention, as needed; and
- Creation of a written or electronic inspection report.

Industrial and Commercial:

- Review of BMP implementation plans, if the site uses or is required to use such a plan;
- Review of facility monitoring data, if the site monitors its runoff;
- Check for coverage under the General Industrial Permit (Notice of Intent (NOI) and/or Waste Discharge Identification No.), if applicable;
- Assessment of compliance with Responsible Agency ordinances and permits related to urban runoff;
- Assessment of BMP implementation, maintenance and effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff; and
- Education and training on storm water pollution prevention, as conditions warrant.

Municipal Areas and Activities

- Review of BMP implementation plans, if the site uses or is required to use such a plan;
- Assessment of compliance with jurisdiction's ordinances and permits related to urban runoff;
- Assessment of BMP implementation, maintenance and effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff.

Residential Areas and Activities

- Assessment of compliance with the jurisdiction's ordinances and permits related to urban runoff;
- Assessment of BMP implementation, maintenance and effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff.

Based upon inspection findings, each jurisdiction implements follow-up actions necessary to comply with the Municipal Permit and any applicable jurisdictional ordinances, permits, etc.

Inspections can target land development, construction, industrial, commercial, residential, and municipal audiences in order to gather the necessary data for program evaluations and effectiveness assessments. Additionally, inspections can address single or multiple pollutants such as bacteria, trash, heavy metals, nutrients, oil and grease, organics, sediment, and pesticides, depending upon the facility type being inspected. However, the effectiveness of inspections in reducing runoff pollutants and discharges is highly variable and dependent upon site-specific conditions, including but not limited to: motivation of facility or site representative/owner; level of difficulty in making required corrections; BMP complexity and other factors.

#### *2.4.2.5 MS4 Inspections/Cleaning*

Operating and maintaining the MS4 infrastructure which includes storm drain pipes, catch basins, inlets, open channels, etc., encompasses a large variety of activities performed by the RAs' municipal or contract staff. Each Responsible Agency implements a schedule of inspection and maintenance activities for the MS4 and MS4 facilities. The maintenance activities that may be conducted include:

- Inventory and prioritization
- Inspection
- Cleaning and proper disposal of any wastes removed
- Recordkeeping of maintenance and cleaning including amounts removed.

Additionally, each Responsible Agency implements controls and measures to prevent and eliminate infiltration of seepage from municipal sanitary sewers to MS4s through thorough, routine preventive maintenance of the MS4 and sanitary sewer collection systems.

Each jurisdiction's MS4 inventory and MS4 inspection and cleaning details are included in their Jurisdictional Runoff Management Program.

The facilitation of the MS4 inspection and cleaning program can provide knowledge and awareness and behavior changes through municipal staff implementing the MS4 inspection and cleaning at the proper frequency and within the proper cleaning guidelines. MS4 cleaning can also achieve source load reductions when the amount of debris removed from the MS4 and MS4 facility cleaning is measured.

#### *2.4.2.6 Street Sweeping*

Street Sweeping is conducted to remove debris, trash, or particles from improved municipal roads (possessing a curb and gutter), streets, highways, and parking facilities. Street sweeping can be effective in removing trash, debris and other constituents of concern, such as metals and plastics, from roadways and parking facilities before entering the storm drain system and potentially reaching receiving waters. In addition, street sweeping helps prevent blockages in storm drains caused from trash and debris that can create flooding issues during periods of heavy rainfall.

Street sweeping implementation will vary by jurisdiction and may vary based on location in the watershed. Street sweeping program information is contained in each JRMP. The measurement of the amount of trash, debris, and constituents of concern removed through street sweeping provides information on the source load reduction.

#### *2.4.2.7 General Education and Outreach*

Education and outreach activities are Core Strategies conducted to increase the knowledge and awareness of a target community regarding storm water, change the behavior of the target community, and/or ultimately reduce pollutants and runoff into the MS4 and receiving waters. In general, an education and outreach strategy is developed and the programs typically address high priority pollutants, pollutant-generating activities, and the following target communities, as applicable and appropriate:

- Municipal departments and personnel (described in employee training);
- Construction site owners and developers;
- Industrial owners and operators;
- Commercial owners and operators; and
- Residential community.

Methods used for education and outreach vary and may include trainings, mass media, mailers, door hangers, booths at public events, workshops, focus groups, classroom education, field trips, hands-on experiences, clean-up events, websites, etc. Education and outreach can be conducted by one or several



RAs and they may combine funds and efforts to conduct activities or develop materials. Education and outreach activities are included in each JRMP.

Education and outreach activities can be facilitation and/or data gathering activities with targeted outcomes focused primarily on knowledge and awareness, and behavior change. Education and outreach effectiveness can be measured and assessed through surveys (i.e. web-based, at events, or on the phone) BMP implementation rates, focus groups, observations, participation in events or workshops, hotline calls, and questionnaires.

#### *2.4.2.8 Employee Training*

Municipal employee, contractor, or consultant storm water training is conducted to increase the knowledge of the target audience in regards to laws, regulations, permits and requirements; BMPs; general urban runoff concepts; and any other relevant topics, as deemed appropriate. Trainings may be job-specific (i.e. MS4 cleaning procedures) or they may be more general, but ultimately they provide a mechanism to communicate jurisdictional requirements to the appropriate employees. Training methods that may be used could be computer based interactive tutorials, classroom style trainings, audiovisual methods (i.e. DVD) or on-the-job training (i.e. training on how to use a street sweeper to maximize material removal). Employee training may vary by jurisdiction and training details are included in each JRMP.

Municipal employee training can provide important information on whether training conducted is effective at increasing employees general and/or job specific knowledge regarding storm water. This type of assessment is often measured and assessed using pre-and post-test questionnaires/surveys. In addition, BMP implementation or changes in behavior may be assessed through employee activity. For example, if general storm water training was conducted for municipal staff to provide them the tools to identify potential illegal discharges, and then the program receives an increase in the municipal staff reporting of potential illegal discharges, then it would indicate that there was a change in behavior based upon the training provided.

#### *2.4.2.9 Enforcement*

Each jurisdiction implements and enforces its ordinances, codes, or other legal authority to prevent illegal discharges and connections to its MS4. Enforcement methods are used to affect a return to compliance at either a construction, municipal, industrial, commercial, or residential area. Some enforcement methods used include verbal warning, letters, educational materials, citations, notices of violation, stop work orders, or civil penalties. Each jurisdiction also implements all follow-up actions necessary to achieve the return to compliance for a particular site. Enforcement procedures vary by jurisdiction and are included in each Jurisdictional Runoff Management Program.

Enforcement is a common tool used to not only return violators to compliance but also to educate and promote compliance. Enforcement is a facilitation activity where the tabulation of enforcement data can be associated with a load reduction. If a site or residence where a pollutant is leaving, or has the potential to leave, the site has been stopped or mitigated through enforcement efforts there is an implied load reduction. The tabulation of enforcement data may also provide information on behavioral changes.

#### *2.4.2.10 Partnership Program(s)*

RAs may partner with entities to coordinate, share, or back projects and programs that have the potential to support overall water quality objectives. These partnerships may come in various forms including, but not limited to:

- Coordination/information sharing meetings
- Review of projects

- Joint grant applications
- Agreements
- Private or joint funding
- Generating letters of support for projects.

It is vital for RAs to partner with outside entities in order to achieve overarching water quality improvement objectives. Based on the MS4 discharge permit, RAs have a direct responsibility for the discharges generated from their MS4 systems. Outside entities have a significant interest in downstream waterways. Partnerships may offer a synergistic pathway to achieving desired outcomes in both MS4 discharges and in waters.

#### *2.4.2.11 Program for Retrofitting Areas of Existing Development*

As a new program requirement under the current MS4 Permit, RAs developed retrofit programs to be included in their Jurisdictional Runoff Management Programs. The retrofit programs are intended to implement retrofit projects in jurisdictional areas of existing development (currently unmitigated land uses) to address identified sources of pollutants and/or stressors that contribute to the identified Priority Water Quality Conditions and Highest Priority Water Quality Conditions.

Programs will include:

- Identification of areas that are candidates for retrofitting
- Development of a strategy to facilitate implementation of retrofit projects in the candidate areas
- Identify areas where development project proponents may use offsite alternative compliance (if allowed by the Responsible Agency[ies]) to implement retrofits
- Opportunities to collaborate with other RAs for regional retrofit projects.

#### *2.4.2.12 Program for Stream, Channel and/or Existing Habitat Rehabilitation in Areas of Existing Development*

As a new program requirement under the current MS4 Permit, RAs developed rehabilitation programs to be included in their JRMPs. The rehabilitation programs are intended to implement rehabilitation projects in jurisdictional areas of existing development (presumably currently unmitigated land uses) to address identified sources of pollutants and/or stressors that contribute to the identified PWQCs and HPWQCs.

Programs will include:

- Identification of streams, channels and/or habitats that are candidates for rehabilitation
- Development of a strategy to facilitate implementation of stream, channel and/or habitat rehabilitation projects in the candidate areas
- Identify areas where development project proponents may use offsite alternative compliance (if allowed by the Responsible Agency[ies]) to implement rehabilitation
- Opportunities to collaborate with other RAs for regional rehabilitation projects.

#### *2.4.2.13 Offsite Alternative Compliance*

RAs have the opportunity to develop and implement Offsite Alternative Compliance (OAC) programs that are intended to allow development project proponents to trade onsite mitigation for water quality impacts for offsite mitigation. Offsite mitigation may come in many forms, but must always be of greater overall water quality benefit to the watershed, than what would have been required to be implemented onsite.

OAC projects may include, but are not limited to:

- Stream restoration projects
- Retrofits in existing development
- Receiving waters restoration

- Land purchases/preservation
- Treatment Control BMPs
  - Proprietary
  - Basins
  - Bioretention
  - Filtration

On an individual basis, RAs are currently evaluating whether they will be implementing OAC programs. If and when implemented, RAs will develop programs that:

- Evaluate Priority Development Projects for applicability for OAC
- Evaluate proposed OAC project benefits for equivalency or greater water quality benefit to the watershed
- Potentially coordinate and through agreement, allow OAC in jurisdictions outside of where the proposed project will be located

#### 2.4.3 Optional Strategies

The RAs have designated optional strategies to be implemented within the Carlsbad WMA. Optional strategies are BMPs, incentives, or programs that may be implemented by the RA within its jurisdiction in addition to the requirements of Permit Provisions E.2 through E.7. Optional strategies that are already planned for implementation do not include additional detail on circumstances that would trigger implementation or funding and resources. In addition to planned optional strategies, the RAs have identified optional strategies that will be triggered for implementation in response to specific conditions and are described in accordance with the requirements of Permit Provision B.3.b(1)(b).

Planned and triggered optional strategies are presented in each of the specific HA sections of the WQIP.

#### 2.4.4 Watershed Management Area Strategies

The RAs have designated Watershed Management Area Strategies for the watershed. These strategies are optional regional or multi-jurisdictional BMPs, incentives, or programs that may be implemented to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, protect the beneficial uses of receiving waters from MS4 discharges, and/or achieve the interim and final numeric goals. The Watershed Management Area strategies that are planned do not include additional detail on circumstances that would trigger implementation as RAs have committed to implementing them and have already secured funding and resources. The Watershed Management Area Strategies for the Carlsbad WMA are summarized in Table 10

**Table 10: WMA Strategies Resources, Triggers, Schedule, and Jurisdictions Involved**

<b>Watershed Management Area Strategy</b>	<b>Circumstances Necessary to Trigger the Implementation of the Strategy <i>B.3.b.(2)(e)</i></b>	<b>Resources Required to Implement Strategy <i>B.3.b.(2)(d)</i></b>	<b>Timeline to Secure Resources for Strategy <i>B.3.b.(3)(b)(iii)</i></b>	<b>Jurisdictions Involved</b>
Coordinate with Integrated Regional Water Management (IRWM) regional water managers to plan for and implement water quality improvement projects (retrofits, stream rehabilitation, or other projects).	Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the RAs to implement.	Participation as a stakeholder in the IRWM Program as appropriate; Council approval of an IRWM proposed project; staffing necessary to implement any identified project.	Participation as a stakeholder in the IRWM program will occur as needed and if funded, to encourage applicable project adoption in the Carlsbad WMA. Individual projects and further participation in grant funding offered through the IRWM will be assessed on a case-by-case basis.	City of San Marcos, City of Carlsbad, City of Encinitas, City of Oceanside, City of Vista, City of Solana Beach, City of Escondido and San Diego County
Implement Sustainable Landscapes Program to encourage landscape retrofits.	Implementation of this strategy may be triggered if (1) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (2) all of the necessary resources have been secured.	Resources required to implement strategy include: staff resources, grant funding, incentive items, and partnerships	Implementation in FY 2016-17, and continuous until grant funding and incentives are depleted; future implementation schedule 1 year once triggered. Addresses pollutants from residential areas, nurseries and greenhouses.	City of San Marcos, City of Carlsbad, City of Encinitas, City of Oceanside, City of Vista, City of Solana Beach, City of Escondido, and San Diego County

#### 2.4.4.1 Watershed Management Area Analysis

All of the Carlsbad WMA RAs have participated in the development of a Watershed Management Area Analysis (WMAA) – see Appendix D. The purpose of the WMAA is to:

- 1) Characterize the WMA through identification of physical characteristics and compilation of the data into GIS mapping;
- 2) Use the WMA characterization as a resource for identification of potential candidate projects for OAC options for fulfilling applicable Land Development requirements of the MS4 permit;
- 3) Use the WMA characterization as a resource for identifying areas within the WMA where exemptions from hydromodification management requirements would be appropriate.

#### Characterization

The attached Carlsbad WMAA provides GIS mapping that characterize the WMAs by providing the following:

- 1) Description of dominant hydrologic processes, such as areas where infiltration or overland flow likely dominates;
- 2) Description of existing streams in the watershed, including bed material and composition, and if they are perennial or ephemeral;
- 3) Current and anticipated future land uses;
- 4) Potential coarse sediment yield areas; and
- 5) Locations of existing flood control structures and channel structures, such as stream armoring, constrictions, grade control structures, and hydromodification or flood management basins.

Completion of a WMAA is a required step prior to allowing OAC as an option for development/redevelopment projects. Although the WMAA has been completed, RAs have not yet developed OAC programs. It is anticipated that those RAs that elect to have OAC programs will develop and implement those programs in the coming years and are identified in the optional strategies in each focus area, where applicable.

The RAs are also required to develop a list of candidate projects that could potentially be used as alternative compliance options in lieu of land development onsite structural BMP performance requirements. The current candidates list is provided as Appendix E. Since the RAs are not intending to implement OAC programs until 2016 at the earliest, the candidates' list is currently not comprehensive and is anticipated to be amended in coming years.

#### *Exemptions from Hydromodification Management Requirements*

Hydromodification management requirements may be exempt from applicable development projects under specific criteria. The WMAA includes a description of the types of hydromodification management requirement exemptions as summarized below, along with current Carlsbad WMA applicability. Future proposed hydromodification management requirement exemptions would need to be approved through the WQIP Annual Update process

##### *1) Exempt River Reaches*

There are no river reaches currently recommended for exemption from hydromodification management requirements in the Carlsbad WMA. However, Escondido Creek is currently being evaluated to assess whether a hydromodification management exemption could apply to this waterbody. Based on the findings of the evaluation, the San Elijo Lagoon may also be evaluated. The results of these studies will be included in future Carlsbad WMAA updates.

##### *2) Stabilized Conveyance Systems Draining to Exempt Water Bodies*

There are no stabilized conveyance systems currently recommended for exemption from hydromodification management requirements in the Carlsbad WMA.

##### *3) Highly Impervious/Highly Urbanized Watersheds and Urban Infill*

No areas within the Carlsbad WMA are currently recommended for highly impervious/highly urbanized watershed or urban infill exemption.

##### *4) Tidally Influenced Lagoons*

Based on a City of Carlsbad study<sup>7</sup>, there are several tidally influenced areas recommended for exemption including:

- a. Areas tributary to Buena Vista Lagoon
- b. Several tributary areas to Agua Hedionda Lagoon
- c. One tributary area to Batiquitos Lagoon

These tidally influenced areas recommended for exemption are subject to the design conditions identified in the February 2016 BMP Design Manual as follows:

- a. A properly sized energy dissipation system must be provided in accordance with local design standards to mitigate outlet discharge velocity from the direct discharge to the

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<sup>7</sup> Hydromodification Exemption Analyses for Select Carlsbad Watersheds, Chang Consultants (September 17, 2015) (Appendix F)

water storage reservoir or lake for the ultimate condition peak design flow of the direct discharge,

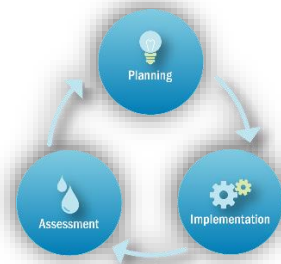
- b. The invert elevation of the direct discharge conveyance system (at the point of discharge to the water storage reservoir or lake) should be equal to or below the lowest normal operating water surface elevation at the point of discharge, unless the outfall discharges to a quay or other non-erodible shore protection. Normal operating water surface elevation may vary by season; contact the reservoir operator to determine the elevation. For cases in which the direct discharge conveyance system outlet invert elevation is above the lowest normal operating water surface elevation but below the reservoir spillway elevation, additional analysis is required to determine if energy dissipation should be extended between the conveyance system outlet and the elevation associated with the lowest normal operating water surface level.
- c. No exemption may be granted for conveyance system outlet invert elevations located above the reservoir spillway elevation.

The San Elijo Lagoon and other tidally influenced waterbodies may also be evaluated for exemption in future analyses.



## 2.5 Iterative and Adaptive Management Process

As a living document, the Carlsbad WMA WQIP will be updated in subsequent years to accommodate evolving programs and adaptations to individual or collective components of the WQIP. Plan adaptations are focused on plan improvements and ultimately achieving compliance with discharge prohibitions and receiving water limitations identified in the MS4 Permit.



**Effectiveness:** the capability of strategies to have an intended outcome and meet objectives

**Efficiency:** strategies producing intended outcome(s) with minimum amount of waste, expense or unnecessary effort

The cycle for updates includes program planning, implementation of the planned program, monitoring and assessment of the implemented program and determining what has been learned during the cycle to feed into the planning of the next cycle. This process of repeating cycles and program improvements constitutes the iterative and adaptive management process.

The iterative process will use data and information collected from implementation of the Carlsbad WQIP and the RAS' JRMPs to improve programs – making them more efficient and effective through adaptations.

Figure 10 illustrates the continual process of improvement while maintaining a focus on water quality improvements. Similar to the iterations of the development of locomotive technology, the WQIP iterative process will use what is learned in each cycle to improve the process and plan. With each iteration, it is expected that the plan implementation will be improved and the strategies implemented will become more effective at addressing water quality issues.

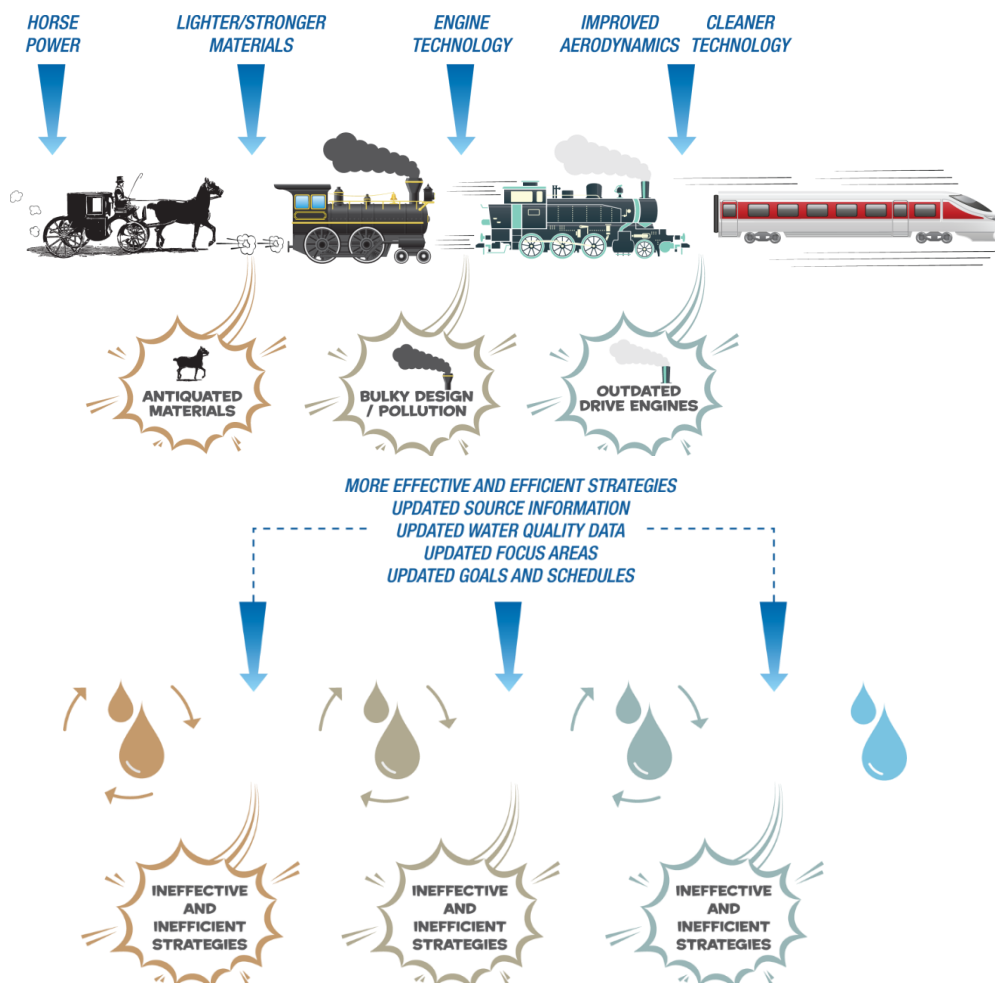


Figure 10: Demonstrated Improvements Using Iterative Process

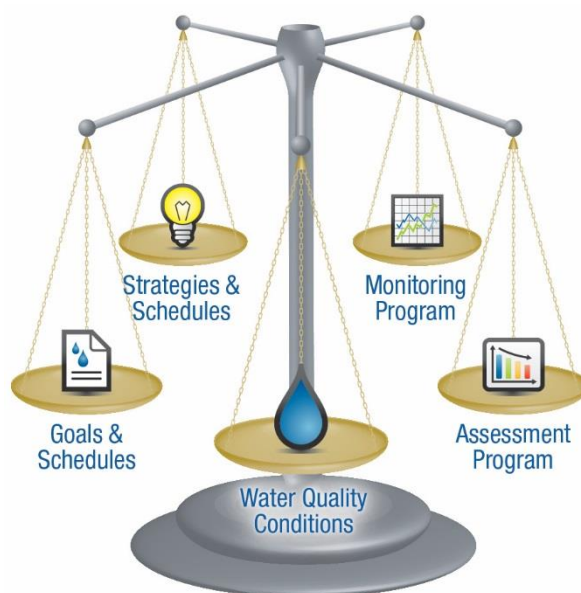
As a result of the monitoring and assessment process, modifications may occur for the following plan components:

- PWQC/HPWQCs
- Water quality numeric goals and schedules
- Water quality improvement strategies and schedules
- Monitoring program, and
- Assessment program.

Potential adaptations for each of the above components are discussed in the sub-sections below.

Proposed modifications to WQIP components will be supported by a rationale to justify the changes. RAs will use a process of data and information collection (monitoring) and evaluation (assessment) to develop the rationale that supports modifications. Monitoring includes a variety of activities intended to collect and assemble relevant data and information that can be evaluated for potential influence on the WQIP components. Assessment includes a variety of calculations, comparisons and determinations that may or may not support WQIP component modifications. Monitoring and assessment approaches that support the iterative process are further discussed in Sections 2.5 and 2.6.

A functional balance amongst all WQIP components exists – see Figure 11. When changes occur within one of the components, it necessitates changes in other components. For example, adaptations in strategies may require modifications to the data collection (monitoring) for the strategies to assure that the data is collected appropriately.



**Figure 11: Balance of Water Quality Improvement Plan Components**

A similar balance is used when considering resources and looking to optimize available resources for achieving improved water quality conditions. By using monitoring data and information and assessment outcomes, the RAs can make informed decisions regarding how and where to best utilize their resources. The results of the decisions will determine program changes necessary to implement the decisions. However, program changes have the potential to take time and resources to implement and pose

unintended consequences. These considerations should also be factored when evaluating program changes.

### 2.5.1 Re-evaluation of Water Quality Conditions

Periodically, the RAs will re-evaluate water quality conditions to determine the PWQCs, based on available data and information. Receiving water quality conditions do not change substantially from year to year. However, in each assessment of available water quality data and information, the RAs will evaluate whether findings demonstrate a compelling need to re-evaluate the current HPWQCs and PWQCs. In the absence of such findings, the RAs maintain that the initial HPWQCs and PWQCs should remain the focus of the WQIP and JRMP implementation.

#### Examples of Prompts for Adaptation of Water Quality Conditions (PWQCs and HPWQCs)

- Beneficial Use(s) in receiving waters are met
- Water quality monitoring data shows MS4 is not causing or contributing to water quality conditions in receiving waters
- Regulatory conditions change: new or developing TMDLs, new policies

At a minimum, a re-evaluation of PWQCs and HPWQCs will be performed and reported in the ROWD, due to the Regional Water Quality Control Board (RWQCB), no later than December 2017.

Re-evaluation of the water quality conditions will consider the best available data and information as used in the initial water quality evaluation as described in Section 2.1. In addition to the data and information collected and evaluated in the initial WQIP development process, the RAs will, at a minimum, consider:

- Whether water quality improvement outcomes were achieved in MS4 discharges and/or receiving waters
- Data, information and recommendations provided by the public
- Water quality monitoring collected after initial WQIP development including transitional monitoring data collected in 2013 and 2014
- Special studies results related to water quality conditions or MS4 sources of pollutants and/or stressors
- New and developing regulations related to water quality conditions, e.g., TMDLs and policies
- Revised 303(d) listings
- Basin plan amendments related to water quality conditions
- RWQCB recommendations

The re-evaluation process will follow a process similar to that used in the initial water quality evaluation described in Section 2.1. If new or modified processes are used, they will be presented in the appropriate document, e.g., Water Quality Improvement Plan Annual Reports or the ROWD in December 2017.

#### Examples of Outcomes from Re-Evaluating Water Quality Conditions

- Adding or removing Priority Water Quality Conditions
- Adding or removing Highest Priority Water Quality Conditions
- Changes in Focus Areas within the WMA

Based on the outcomes of the re-evaluation process, the RAs will determine whether adaptations to the Priority Water Quality Conditions are justified. Changes to the PWQCs and HPWQCs listings will be made if new conditions are identified or conversely, if assessments support removal of conditions from the current listings.

### 2.5.2 Adaption of Goals and Schedules

Numeric goals and the associated schedules for meeting interim and final goals are subject to adaptation. Achieving goals is accomplished through successful implementation of effective strategies and then appropriately monitoring and assessing the effects of such strategies.

At a minimum, a re-evaluation of goals and schedules will be performed and reported in the ROWD, due to the Regional Water Quality Control Board (RWQCB), no later than December 2017.

Re-evaluation of the goals and schedules will consider:

- Quantitative and temporal progress toward achieving interim and final goals
- New and developing regulations related to the established goals
- Water quality and conditions assessments
- Changes to PWQCs, HPWQCs or Focused Priorities based on re-evaluations
- Data, information and recommendations provided by the public
- Special studies results related to goals
- RWQCB recommendations
- Amount of resources applied in areas of associated established goals, and
- Effectiveness of strategies implemented in areas of associated established goals.

The goals and schedules established are based upon existing conditions and many unknowns, e.g. resources necessary to implement identified water quality improvement strategies, effectiveness of identified strategies and, in many cases, the baseline water quality conditions the strategies and associated goals are intended to change. It is anticipated that the goals and schedules may be dynamic in the first few years of implementation as the RAs continue to collect effectiveness and efficiency data and information. However, through the iterative process, the goals and schedules are expected to stabilize, along with other components of the WQIP.

The rate of progress toward achieving interim and final goals will be one of the key considerations in evaluating whether goals and schedules should be adjusted. Using a combination of assessments, RAs will compare the anticipated (identified in goal schedules) and actual measured rates of progress to determine if adjustments to the goals or schedules are warranted.

**Examples of Outcomes from Adapting Goals and Schedule**

- Changing timelines to achieve interim and final goals/targets
- Modifying goals/targets
- Change locations of where goals/targets are focused

RAs may consider the following potential prompts for adaptations to the goals and/or schedules:

- When the level of effort expended (implemented strategies) does not correlate well with the rate of progress toward achieving interim and final goals
- When it is determined that the identified goals do not demonstrate progress towards meeting the ultimate goals of eliminating MS4 non-storm water discharges, eliminating pollutants in MS4 storm water discharges, or restoring/protecting beneficial uses in downstream receiving waters

In order to adapt goals and schedules, assessed monitoring and strategy data will be necessary to evaluate the progress toward achieving the interim and final numeric goals. Based upon the type of goals identified, a variety of monitoring must be conducted and results of the monitoring assessed. The monitoring types and assessment of the collected data and information are described in general in the monitoring and assessment sections below.

### 2.5.3 Strategies and Schedules

Strategies and associated schedules are subject to adaptation through the iterative process. Modifying programs to implement the most effective and efficient strategies are an inherent objective of program improvements. When strategies are more efficient and effective, their application in larger geographic scales or greater frequencies is expected to yield measureable outcomes identified through the

assessments. However, assessing strategies for the purposes of determining adaptations can be challenging; linking implementation of strategies to change in water quality conditions.

At a minimum, a re-evaluation of the strategies and schedules will be performed and reported in the Report of Waste Discharge (ROWD), due to the Regional Water Quality Control Board (RWQCB) no later than December 2017.

Evaluating strategies and schedules will consider many factors, including:

- Quantitative and temporal progress toward achieving interim and final goals
- Water quality and conditions assessments
- Changes to PWQCs or HPWQCs based on re-evaluations
- Data, information and recommendations provided by the public
- Special studies results related to strategies
- RWQCB recommendations
- Amount of resources applied in areas of associated established goals

Although the Permit identifies steps to be taken for re-evaluation of strategies (Provision D.4.d.(2)), the RAs will also look beyond those minimum required steps and evaluate the relative effectiveness and efficiency of implemented strategies. By comparing effectiveness and efficiencies of strategies, RAs will be better equipped to make management decisions related to prioritization of strategies for implementation.

Modifications to strategies may include, but are not limited to:

- Removal or addition of strategies from the suite of implemented strategies
- Analysis of optional strategies for implementation
- Modifications to the methods of strategy implementation, e.g., methods for conducting inspections
- Implementation of strategies on greater or modified geographical scales
- Modifications to strategy implementation schedules

In order to adapt strategies and schedules, assessed monitoring and strategy data will be necessary to evaluate strategy effectiveness and efficiencies. The monitoring types and assessment of the collected data and information are described in general in the monitoring and assessment sections below.

#### 2.5.4 Adaptation of Monitoring and Assessment Programs

As previously stated, the WQIP components are interrelated; changes to one of the components will impact other components. This interrelatedness also includes the monitoring and assessment programs. Changes to PWQCs, HPWQCs, focused priorities, goals and/or strategies, affects the monitoring and assessment approaches. The types of data and information collected will vary which subsequently affects the manner in which it is assessed.

At a minimum, a re-evaluation of the Monitoring and Assessment Program will be performed and reported in the ROWD, due to the Regional Water Quality Control Board (RWQCB), no later than December 2017.

Considerations the RAs will evaluate when determining whether the Monitoring and Assessment Program will be modified include:

- Sufficiency of existing monitoring programs to generate required findings, i.e., are there data gaps preventing assessments from being completed

- Sufficiency of existing monitoring programs to adequately capture changes in water quality conditions or the established goal metrics, i.e., assessments can be completed, but there is not enough data to develop significant findings that provide rationale for adaptations or to justify maintaining plan components
- Sufficiency of existing assessments to provide findings to provide rationale for adaptations or to justify maintaining plan components

The RAs will evaluate the Monitoring and Assessment Program by reviewing the data collected and the assessments performed. For each assessment identified in the MAP, the following will be determined: (1) Is there adequate data to perform the assessment?; and (2) Does the outcome of the assessment provide rationale for adaptations or to justify maintaining plan components?

Based on the assessment of the monitoring and assessment programs, RAs may elect to modify monitoring elements (while maintaining consistency with Permit requirements) as well as assessments.



## 2.6 Monitoring

Monitoring includes a variety of activities intended to collect data and information that can be evaluated and assessed to inform the iterative process and the status of water quality related topics. In terms of the WQIP, monitoring includes collecting data and information from:

- Water quality monitoring and analyses results
- Program implementation including JRMP implementation
- Understanding regulatory issues that may impact program function, e.g., permit reissuance, TMDLs and trash policies, and
- Understanding new science and technologies.

The RAs in the Carlsbad Watershed have developed a monitoring program to collect data and information for the following purposes:

- Measure progress toward achieving the goals, strategies, and schedules;
- Measure progress toward addressing the Focused or Highest Priority Water Quality Condition;
- Evaluate each Responsible Agency's overall efforts to implement the Water Quality Improvement Plan
- Evaluate water quality conditions in some receiving waters
- Measure MS4 contributions from select outfalls
- Provide rationale for program changes through the iterative process, and
- Measure compliance with TMDL(s) or similar regulatory drivers.

The Municipal Permit supports an outcome-based approach through the Water Quality Improvement Plan. Monitoring data collection and assessment provides the vehicle for determining whether intended outcomes are being realized or whether adaptations of RAs programs are necessary. Collection and assessment of monitoring data will guide future implementation of the RAs management actions as part of the WQIP process. Monitoring during wet and dry weather is conducted to collect observational and analytical data at MS4 outfalls and the receiving waters. The data will be utilized to help RAs determine whether discharges from MS4 outfalls are influencing receiving water conditions. RAs assess the data in combination with their management actions to determine what actions are improving the quality of MS4 outfall discharges and receiving water conditions and where additional actions are necessary.

WQIP Monitoring includes sampling, inspection, and data collection at beaches, creeks, lakes, estuaries, and storm drain outfalls to observe conditions, improve understanding, and inform the management within the watershed to improve water quality conditions

This section provides an overview of the WQIP Monitoring Program, including permit-required water quality monitoring, tracking of water quality regulations and policy, and collecting other additional information and data to evaluate strategies.

### 2.6.1 JRMP Program

Through implementation of the JRMPs, the RA will have the opportunity to record relevant program implementation data and information aside from water quality data. This data and information is useful for the purposes of evaluating program implementation and determining effectiveness and efficiency of strategies.

### 2.6.2 Regulations and Policy

RAs will monitor the progression of relevant water quality regulations and policies. These regulations and policies may modify the terms and conditions of compliance and influence WQIP priorities, strategies, and monitoring. These policies directly affect the RAs' water quality programs and effective use of resources.

Example regulations and policies for monitoring include:

- Statewide Nutrient Policy
- USEPA Recreation Water Quality Criteria
- Bacteria TMDL Reopener
- Ocean Plan Amendments
- State-wide Quality Control Plan for Trash
- State-wide Biological Integrity Assessment Implementation Plan
- National Water Quality Criteria for the Protection of Human Health
- USEPA Definition of the “Waters of US”
- Regional Water Quality Control Board
  - Resolutions
  - Directives
  - Enforcement Actions
- Region 9 - Triennial Review.

### 2.6.3 Water Quality Monitoring Program

The Water Quality Monitoring Program includes four major elements:

- Monitoring to assess progress toward goals and schedules;
- Receiving water monitoring program that measures the long-term health of the watershed during dry and wet weather conditions;
- MS4 outfall monitoring program that investigates the elimination of dry weather flows from MS4 outfalls and the improvement in quality of the discharges from storm drains during wet weather; and
- Special studies that take a further look into HPWQC.

**Wet Weather** is defined as a storm event of >0.1 inch of rainfall and the following 72 hours after the end of rainfall.

**Dry Weather** is defined as all days where the preceding 72 hours have been without measurable precipitation (>0.1 inch).

These program elements will generate data to track priority water quality conditions and general health and conditions within the watershed. Monitoring is conducted to: characterize overall water quality in the discharges from MS4 outfalls in addition to bacteria and nutrient levels; identify potential sources; and assess the effectiveness of strategies. This section provides an overview of each monitoring program element. The associated monitoring plans for each of the various programs described in the following sections are separate documents and are posted at the Project Clean Water website, [www.projectcleanwater.org](http://www.projectcleanwater.org) under the Carlsbad Watershed Section of the webpage.

#### 2.6.3.1 Monitoring to Assess Progress Toward Achieving Goals and Schedules

RAs have identified strategies that are expected to have multi-pollutant benefits, targeting non-storm water flows and HPWQCs. Each RA has established water quality interim and final goals for focus areas within HAs. In order to measure progress toward meeting established goals, data collection and monitoring elements are tailored to capture data appropriate for assessment. Descriptions of the monitoring and assessment approaches for each of the goals are provided in Section 3.

#### 2.6.3.2 MS4 Outfall Monitoring Program

The purpose of the MS4 Outfall Monitoring Program is to evaluate the potential impact from MS4 discharges on the beneficial uses of the waterbody. This program seeks to answer the following question: Do non-storm water or storm water discharges from the MS4 outfalls contribute to receiving water quality problems? The Program includes MS4 Field Screening, MS4 Outfall Monitoring in both dry and wet weather conditions to include sampling for bacteria, nutrients and metals, and monitoring in support of the Low Flow Special Study (Table 11).

**Table 11: MS4 Outfall Monitoring**

WQIP Monitoring Program	Condition	Monitoring Element	Permit Schedule				
			2013- 2014	2014- 2015	2015- 2016	2016- 2017	2017- 2018
MS4 Field Screening	Dry	Visual: flow condition, assessment of trash in and around the station, IC/IDs	● <sup>2</sup>	● <sup>2</sup>	●	●	●
MS4 outfall	Dry	Field parameters, conventionals, bacteria <sup>1</sup> , nutrients <sup>1</sup> , metals	-	-	●	●	●
	Wet	Field parameters, conventionals, bacteria <sup>1</sup> , nutrients <sup>1</sup> , metals	● <sup>2</sup>	● <sup>2</sup>	●	●	●
Low Flow Special Study	Dry	Nutrient/Bacteria <sup>1</sup> and flow monitoring	-	-	●	●	●

IC/ID = illicit connection and/or illicit discharge bacteria = fecal indicator

<sup>1</sup>Bacteria and nutrient related analytical testing is related to Highest Priority Water Quality Conditions in the Carlsbad WMA.

<sup>2</sup>Completed under the Transitional Monitoring Program in accordance with Permit Provisions D.1.a and D.2.a.

Table 12 provides the number of major outfalls to be monitored under each component of the MS4 Outfall Monitoring Program by RAs. Detailed proposed monitoring methods and procedures are presented in the MS4 Outfall Monitoring Plan posted on the Project Clean Water website ([www.projectcleanwater.org](http://www.projectcleanwater.org)). These methods and procedures may be modified on the basis of site-specific environmental conditions and updated analytical methodologies. The number of major outfalls monitored per year as shown in Table 12 are subject to change based on new information, updates to the RAs MS4 outfall inventories, changes in transient or persistent flow classifications, and/or changes or updates to the priority water quality conditions over the life of the WQIP. These outfalls are shown in Figure 12 below.

**Table 12: Number of Major MS4 Outfalls per Jurisdiction**

Jurisdiction	Number of Major Outfalls Monitored Per Year		
	Field Screening	Dry Weather Monitoring	Wet Weather Monitoring <sup>4</sup>
City of Carlsbad	144 <sup>2</sup>	5	1
City of Encinitas	54 <sup>1</sup>	5	1
City of Escondido	87 <sup>1</sup>	5	1
City of Oceanside	57 <sup>1</sup>	5	1
City of San Marcos	49 <sup>1</sup>	5	1
City of Solana Beach	2 <sup>1</sup>	2 <sup>3</sup>	1
City of Vista	52 <sup>1</sup>	5	1
County of San Diego	14 <sup>1</sup>	5	1

<sup>1</sup>For RAs with fewer than 125 major MS4 outfalls in the watershed, 80% of major outfalls must be screened twice per year.

<sup>2</sup>For RAs with fewer than 500 but more than 125 major MS4 outfalls in the watershed, 100% of major outfalls must be screened once per year.

<sup>3</sup>If a Responsible Agency has less than 5 major MS4 outfalls within the watershed, the Responsible Agency will be monitoring all its major MS4 outfalls with persistent flow.

<sup>4</sup>At least one wet weather MS4 outfall per Responsible Agency within the watershed.

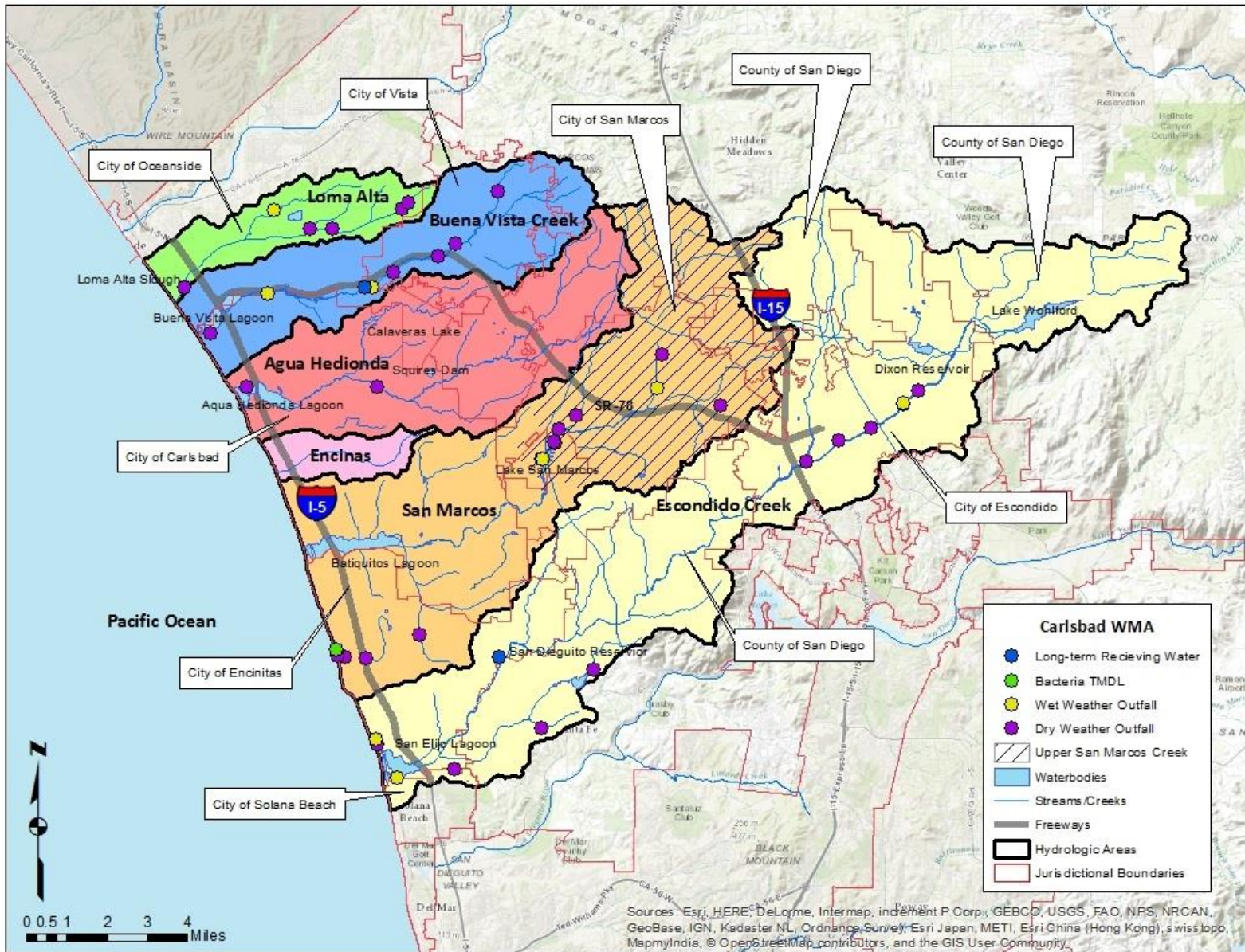


Figure 12: Carlsbad WMA Monitoring Locations



### MS4 Outfall Dry Weather Monitoring

The purpose of the MS4 Outfall Dry Weather Monitoring Program is to evaluate the potential contribution from MS4 discharges to receiving water quality during dry weather conditions as well as to assess the ability of programs to effectively eliminate non-storm water discharges to water bodies or waterways. Each RA has established a number of major MS4 outfalls that will be screened once or twice annually. Additionally, the highest priority major MS4 outfalls with persistent dry weather flows have been identified for further water quality testing to facilitate source investigations for these outfalls. Each of the identified highest priority major MS4 outfalls will be monitored at least twice per year during dry weather conditions. During each event, field observations will be recorded, and when measureable flow is present, *in-situ* field measurements and analytical data will be collected.

### MS4 Outfall Wet Weather Monitoring

The purpose of this program is to identify pollutants in storm water discharges from the MS4, guide pollutant source identification efforts, and track progress in achieving the goals. The RAs' eight monitoring locations for the wet weather MS4 outfall discharge monitoring component were chosen to be representative of the residential, commercial, industrial, and mixed-use land uses within the Carlsbad Watershed. Each identified outfall will be monitored once per year during a storm event with greater than 0.1 inch of daily rainfall. During each event, rainfall, estimated or measured flow rates, *in-situ* field measurements and analytical data will be collected.

### 2.6.3.3 Special Studies

Special studies have been identified to further investigate HPWQC. The purpose of the special studies is to "address pollutant and/or stressor data gaps and/or develop information necessary to more effectively address the pollutants and/or stressors that cause or contribute to Highest Priority Water Quality Conditions identified in the Water Quality Improvement Plan." (Order R9-2013) The special studies will include regional special studies and special studies specific to the Carlsbad Watershed. Special studies identified for the Carlsbad Watershed will provide additional information on HPWQCs and goals identified by the Carlsbad Watershed's RAs.

**Table 13: Carlsbad WMA Special Studies Monitoring**

WQP Monitoring Program	Condition	Monitoring Element	Schedule				
			2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
San Diego Regional Reference Streams and Beaches <sup>2</sup>	Dry	Field parameters, conventionals, bacteria <sup>1</sup> instantaneous flow	2012-2014	● <sup>2</sup>	●	—	—
		Streams only: nutrients <sup>1</sup> , metals, algae bioassessment <sup>1</sup> , including physical habitat and chlorophyll a <sup>1</sup>	2012-2014	—	—	—	—
	Wet	Field parameters, conventionals, bacteria <sup>1</sup>	2012-2014	●	●—	—	—
		Streams only: nutrients <sup>1</sup> , metals, toxicity, flow and precipitation (duration of storm)	2012-2014	●	—	—	—
Bight '13 Microbiology Drainage Water Study	Wet, Dry	Bacteria <sup>1</sup> , MST <sup>1</sup>	●	—	—	—	—
Loma Alta Slough Eutrophication Reduction Study	Dry	Nutrients <sup>1</sup> , algae <sup>1</sup> , biomass <sup>1</sup> , flow monitoring	—	—	●	●	●

WQIP Monitoring Program	Condition	Monitoring Element	Schedule				
			2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Clean Beaches Initiative Grant – Fecal Indicator Bacteria Microbial Source Identification Study for Buccaneer Beach and Loma Alta Creek	Wet, Dry	Field parameters, Fecal Indicator Bacteria and human-associated, dog-associated, and avian-associated microbial source tracking genetic marker assays				•	•
Dry Weather Special Study at Identified Major Persistent Flow Outfalls	Dry	Bacteria, nutrient <sup>1</sup> and /or flow monitoring	–	–	•	•	•

<sup>1</sup>Bacteria, nutrient, algae bioassessments, physical habitat, or biomass related analytical testing is related to Highest Priority Water Quality Conditions in the Carlsbad Watershed.

<sup>2</sup>The Reference Beaches Study dry weather monitoring program was implemented during 2014-2015. The Reference Streams Study dry weather monitoring was completed in 2013-2014.

#### San Diego Regional Reference Streams and Beaches Studies

RAs have elected to participate in the San Diego Regional Reference Streams and Beaches Studies, conducted by the San Diego and Orange County Permittees of Municipal Storm Water Permits. The studies measure levels of bacteria that account for “natural sources” to establish the concentrations or loads from streams or beaches minimally disturbed by anthropogenic activities or “reference” conditions. The Reference Stream Study also collects nutrients, metals, and toxicity data as secondary constituents. This study provides a scientific basis for updating the reference conditions to be considered in evaluating appropriate compliance levels in the Bacteria TMDL. The results of this study will be used to support the forthcoming re-evaluation of the adopted Bacteria TMDL and to support numeric target development in future TMDLs or alternative regulatory approaches for nutrients and metals.

The San Diego Regional Reference Stream Study will address the following questions (SCCWRP, 2013) in streams minimally influenced by anthropogenic activities:

- How does the Water Quality Objective (WQO) exceedance frequency vary between summer dry weather, winter dry weather, and wet weather?
- How does the WQO exceedance frequency vary by hydrologic factors?
- How does the WQO exceedance frequency vary by input factors?
- How does the WQO exceedance frequency vary by biotic and abiotic factors?

The San Diego Regional Reference Beaches Study will address the following questions (SCCWRP, 2013) in beaches minimally influenced by anthropogenic activities:

- How does the WQO exceedance frequency vary between summer dry weather, winter dry weather, and wet weather?
- How does the WQO exceedance frequency vary by hydrologic factors, including discharge flow rate (wet and dry weather)?
- What is the status of estuary mouth (open/closed; dry weather only)?
- What are the wet and dry weather exceedance frequencies of fecal indicator bacteria in estuaries?

A total of six locations were identified for wet weather monitoring and up to 10 locations were identified for dry weather monitoring. Sites were identified to represent 95 percent undeveloped land uses (reference conditions), two major geologic settings, and the target catchment sizes. Dry weather sampling frequency at the 10 locations consists of weekly samples such that 5 samples will occur within a 30-day



period. Wet weather sampling frequency at the six locations consists of three targeted events throughout the wet season (October 1 through April 31). Water samples will be analyzed for a combination of conventional constituents, nutrients, metals, fecal indicator bacteria, microbial source testing, and algae. Of these constituents, *Enterococcus*, *E. coli*, fecal coliform, total coliform, Bacteroides, and *in-situ* parameters are of primary importance; all other analytes are considered secondary.

#### ***Loma Alta Slough Eutrophication Reduction Study***

The Loma Alta Slough has been on the Clean Water Act Section 303(d) list for impairments related to eutrophication since 1996. The RWQCB has been working with stakeholders since 2008 to develop a strategy to address the impairment, which occurs during the months when macroalgae growth in the Slough leads to the eutrophic condition. A draft TMDL was calculated for the Slough, but has not yet been put into action; instead, the RWQCB has given the City of Oceanside the opportunity to use the existing Permit and its own set of strategies to address the impairment. This voluntary study involves a long-term water quality monitoring program for the Loma Alta Slough, to assess the effectiveness of the City of Oceanside's watershed management efforts through tracking the levels of nutrients and algae growth during the impairment period. It will also utilize monitoring data from MS4 outfalls discharging to Loma Alta Creek, which is required pursuant to Provision D.2.b of the Permit. The study is directly related to nutrients and eutrophic conditions, the HPWQC in the Loma Alta Creek HSA.

This special study is presented in the Loma Alta Hydrologic Area section of this WQIP – see Section 3.1 for more details.

#### ***Clean Beaches Initiative Grant – Fecal Indicator Bacteria Microbial Source Identification Study for Buccaneer Beach and Loma Alta Creek***

The City of Oceanside has been awarded funding from the State Water Resources Control Board Clean Beaches Initiative Grant Program for a research study to identify sources of Fecal Indicator Bacteria (FIB) to Loma Alta Creek and Buccaneer Beach during critical impairment conditions. Loma Alta Creek and Buccaneer Beach are located in the Loma Alta hydrologic area, the northern most hydrologic area in the Carlsbad Hydrologic Unit. This 18-month project will begin in January 2016 and be completed in October 2017.

The project will use a tiered water quality assessment approach from the California Microbial Source Identification Manual (Griffith et al., 2013, hereinafter referred to as Source ID Manual) to gain an understanding of the main FIB contributors in the Loma Alta Creek, Loma Alta Slough and Buccaneer Beach. A successful source identification project will support long-term water quality improvement at this beach through an increased understanding of the sources and natural processes affecting FIB distribution and persistence.

A Microbial Source Tracking (MST) sampling and analysis plan will be developed, placing the highest priority on detecting or confirming potential human FIB sources in the watershed. MST sampling will be conducted for molecular indicators of human and non-human fecal pollution at Buccaneer Beach and in Loma Alta Creek. A source identification report will be prepared summarizing the findings and MST data analysis, and will provide recommendations for remediation projects to eliminate FIB contamination of Buccaneer Beach and Loma Alta Creek.

#### ***Dry Weather Special Study at Selected Major Persistent Flow Outfalls***

A Dry Weather Special Study has been developed to characterize temporal flow, nutrients, fecal indicator bacteria, and other applicable pollutant patterns at identified persistently flowing major MS4 outfalls during dry weather conditions. This study includes continuous flow monitoring at select outfalls to better understand dry weather flow profiles at different times of the day. The Dry Weather Special Study will be

implemented in priority areas within the respective jurisdictional areas for the cities of Carlsbad, Encinitas, San Marcos, Escondido, Oceanside and Vista, and the County of San Diego. The Dry Weather Special Study addresses the following Carlsbad WMA HPWQCs:

- Nutrients
- Indicator bacteria
- Riparian habitat degradation (non-storm water flows and associated pollutants)

The Dry Weather Special Study data will be compiled and assessed for each location and, where appropriate, on a HA or WMA level.

This special study is presented in the Agua Hedionda, San Marcos, and Escondido Creek HA sections of this WQIP – see Sections 3.3.5, 3.5.5, and 3.6.5 for more information.

#### *Bight '13 Microbiology Drainage Water Study Plan*

MS4 drainages may greatly influence the exceedance frequency of water quality standards for *Enterococcus*, a type of fecal indicator bacteria at beaches. However, as stated in the Bight '13 Microbiology Drainage Water Study Work Plan, “because *Enterococcus* is a non-specific indicator of fecal material, the extent to which these flows contain human fecal contamination is unclear”. The goal of the study is to assess the extent of human fecal contamination from coastal drainages to the ocean to inform RAs as to the extent of the problem and to assist in prioritizing individual sites for remediation efforts or adoption of alternative management strategies (Griffith, 2010).

The City of Encinitas will conduct this special study within the local Moonlight Beach area. This special study is presented in the San Marcos Hydrologic Area section of this WQIP – see Section 3.5 for more information.

#### *2.6.3.4 Receiving Water Monitoring*

The purpose of the Receiving Water Monitoring Program is to characterize trends in the chemical, physical, and biological conditions of a receiving water to determine whether beneficial uses are protected, maintained, or enhanced. Receiving water monitoring comprises the following programs:

- Long-term receiving water monitoring
- Toxicity identification evaluation/toxicity reduction evaluation, if appropriate
- Regional monitoring participation
- Sediment quality monitoring, and
- TMDL monitoring.

The receiving water programs are designed to answer one or more of the following questions:

- Are conditions in the receiving water protective, or likely protective, of beneficial uses?
- What are the extent and magnitude of the current or potential receiving water problems?
- Are the conditions in the receiving water getting better or worse?

Table 14 on the following page identifies the Receiving Water Monitoring Program for the Carlsbad WMA. Descriptions of the Receiving Water Monitoring Program elements are provided below starting with Long-Term Receiving Water Monitoring.

**Table 14: Receiving Water Monitoring Program**

WQIP Monitoring Program		Condition	Monitoring Element	Schedule				
				2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018
Long-Term Receiving Water Monitoring		Dry	Conventional, bacteria <sup>1</sup> , nutrients <sup>1</sup> , metals, pesticides, toxicity (chronic), possible TIE/TREs, visual observations, field measurements	● <sup>2</sup>	—	—	—	—
			Hydromodification (channel conditions, discharge points, habitat integrity, evidence and estimate of erosion and habitat impacts)	● <sup>2</sup>	—	—	—	—
			Bioassessment (BMI taxonomy, algae <sup>1</sup> , taxonomy, physical habitat characteristics)	● <sup>2</sup>	—	—	—	—
		Wet	Conventional, bacteria <sup>1</sup> , nutrients <sup>1</sup> , metals, pesticides, toxicity (chronic), field measurements	● <sup>2</sup>	—	—	—	—
Regional Monitoring Participation	Bight	Dry	Chemistry, toxicity, benthic infauna	●	—	—	—	● <sup>3</sup>
	SMC	Dry	Bioassessment	●	●	●	●	●
	2011 Hydromodification Monitoring Program	Wet	Channel assessments, flow monitoring, sediment transport monitoring	●	●	●	—	—
Sediment Quality Monitoring	Sediment Quality Monitoring	Dry	Chemistry, toxicity, benthic infauna	● <sup>2</sup>	● <sup>2</sup>	—	—	—
Long-Term Water Quality Monitoring at Loma Alta Slough	Macroalgae growth and nutrient loading	Dry	Nutrients <sup>1</sup> , dissolved oxygen, conductivity, pH, temperature, turbidity, flow, macroalgae biomass	—	—	—	●	●
Long-Term Flow & Water Quality Monitoring at Upper San Marcos Creek	Year-round flow monitoring & wet weather nutrient loading	Wet	Nutrients, total suspended solids and flow				●	●
TMDL Monitoring	Bacteria TMDL for Moonlight Beach	Dry	Bacteria <sup>1</sup>	● <sup>4</sup>	● <sup>4</sup>	●	●	●
		Wet	Bacteria <sup>1</sup>	—	—	●	●	●

BMI=Benthic macroinvertebrates

Bacteria = fecal indicator

SMC=Southern California Storm Water Monitoring Coalition

Bight=Southern California Bight Regional Monitoring Program

TIE=Toxicity Identification Evaluation

TRE=Toxicity Reduction Evaluation

<sup>1</sup>Bacteria and nutrient related analytical testing is related to the Highest Priority Water Quality Conditions in the Carlsbad Watershed.

<sup>2</sup>Completed under the Transitional Monitoring Program in accordance with Permit Provisions D.1.a and D.2.a.

<sup>3</sup>The 2018 Southern California Bight Regional Monitoring will occur during the summer of 2018 or 2019.

<sup>4</sup>County of San Diego Department of Environmental Health conducts dry weather monitoring at beaches, including Moonlight Beach, under the Assembly Bill 411 (AB411) Monitoring Program.

### Long-Term Receiving Water Monitoring

Long-term receiving water monitoring tracks the overall health of the receiving waters. Unless modified, dry and wet weather monitoring will continue at the historical mass loading station (EC-MLS) located on Escondido Creek and the Buena Vista mass loading station (BV-MLS) located on Buena Vista Creek (Table 15).

The RAs considered all receiving water monitoring that will be conducted within the Carlsbad WMA when selecting long-term receiving water monitoring locations. The RA considerations included spatial variability, representative and applicable monitoring site locations, and program implementation assessment capabilities. As identified in Table 14, there will be receiving water monitoring conducted in the Loma Alta HA, (long-term water quality monitoring at Loma Alta Slough), Upper San Marcos HA (Long Term Flow & Water Quality Monitoring at Upper San Marcos Creek), and Lower San Marcos HA (Bacteria TMDL monitoring). In addition, there will be monitoring conducted in the Agua Hedionda HA for the Roman Creek Wetland Project and the Agua Hedionda Creek Restoration Project. The monitoring plans for these two projects will be developed as part of each project at a later date and included in future WQIP Annual Reports or Updates. The RAs identified Buena Vista HA (BV-MLS) and Escondido Creek HA (EC-MLS) as the locations for long-term receiving water monitoring stations within the Carlsbad WMA to assist in providing data to assess program implementation.

**Table 15: Carlsbad Watershed Long-Term Receiving Water Stations**

Station ID	Latitude	Longitude	Cross Street Description	Channel Type	Jurisdiction
EC-MLS	33.0482901	-117.226032	El Camino Del Norte Bridge	Natural Channel	City of Encinitas
BV-MLS	33.18263	-117.28394	At Buena Vista Creek, south of the east terminus of Tiberon Drive	Concrete-lined Channel	City of Vista

Source: Transitional Receiving Water Monitoring Plan (Weston, 2014a)

RAs have monitored EC-MLS since 2001 and BV-MLS since 2011. The land uses in the surrounding drainage area for EC-MLS are primarily residential with open space, and commercial, and the surrounding drainage area land uses for BV-MLS primarily consist of residential, commercial, and open space. The locations of EC-MLS and BV-MLS are shown in Figure 12. Both sites will provide historic data and offer information on program implementation within the respective HAs to assist with assessment and adaptive management.

In each five-year cycle, these sites, unless modified, will be monitored three times during dry weather and three times during wet weather. Dry and wet weather receiving water monitoring has been completed during the current Permit term and the monitoring will continue at these two locations during the next Permit term. This monitoring program is designed to monitor the HPWQCs in the receiving water, along with a comprehensive list of constituents based on the Clean Water Act Section 303(d) list (303(d) list) impairments, non-storm water action levels (NALs) or storm water action levels (SALs). Toxicity Identification Evaluations (TIE)s/Toxicity Reduction Evaluations (TRE)s will be conducted if necessary (see below). Once per five-year cycle during dry weather, a bioassessment will be conducted to evaluate chemical, physical, and biological data, and hydromodification monitoring will record the stream conditions, habitat integrity, and impacts. Detailed monitoring methods and procedures are presented in the Receiving Water Monitoring Plan. The methods and procedures may be modified on the basis of site-specific environmental conditions and updated analytical methodologies.

#### *Toxicity Identification Evaluation/Toxicity Reduction Evaluation*

If chronic toxicity is detected in receiving waters, the Copermittees will evaluate the need for conducting a Toxicity Identification Evaluation (TIE)/Toxicity Reduction Evaluation (TRE). A TIE is a set of procedures to identify specific chemicals or conditions responsible for toxicity; a TRE is a study designed to identify causative agents of effluent or ambient toxicity, isolate its sources, evaluate effectiveness of toxicity control options, and confirm reduction of toxicity. An outline of the process to identify chronic toxicity and prioritize the need to implement a TIE/TRE on the basis of the magnitude and persistence of chronic toxicity is presented in the TIE/TRE Work Plan which can be found on the Project Clean Water website ([www.projectcleanwater.org](http://www.projectcleanwater.org)).

#### *Regional Monitoring Participation*

Regional monitoring includes separate studies that evaluate various aspects of receiving water health on a regional scale. The Carlsbad RAs participate in three separate regional programs: (1) Bight Regional Monitoring; (2) Stormwater Monitoring Coalition Regional Monitoring; and (3) Hydromodification Regional Monitoring Program. Descriptions of each program are provided below.

#### *Bight Regional Monitoring*

The Bight Regional Monitoring Program is a multi-agency collaborative effort to assess the ecological condition of the Southern California Bight from a regional perspective. The core program consists of monitoring of sediment chemistry, sediment toxicity, and benthic infauna. The goals of past Bight programs are to answer three primary questions:

- What are the extent and magnitude of direct impact from sediment contaminants?
- How do the extent and magnitude of the environmental impact vary by habitat?
- What is the trend in extent and magnitude of direct impacts from sediment contaminants?

Sediment quality monitoring was conducted during summer 2013 at a total of 22 sites in 9 estuaries and lagoons in the San Diego region, including Agua Hedionda, Batiquitos, and San Elijo Lagoons, under the Southern California Bight 2013 Regional Monitoring Survey (Bight '13) (Weston, 2014c). RAs will participate in planning Bight '18 monitoring programs in coming years.

#### *Stormwater Monitoring Coalition (SMC) Regional Monitoring*

Since 2001, RAs have partnered with regulated storm water municipalities in southern California, the RWQCBs of southern California, and the Southern California Coastal Water Research Project (SCCWRP) to form the Southern California Stormwater Monitoring Coalition (SMC). The goals of the SMC are to standardize monitoring, improve understanding of storm water mechanics, and identify receiving water impacts from storm water (SCCWRP, 2002). The RAs will continue participation in the SMC Regional Bioassessment Program.

#### *Hydromodification Regional Monitoring Program*

The San Diego County Regional Copermittees have developed a regional Hydromodification Management Plan (HMP) to address impacts to beneficial uses and stream habitat from increased erosive forces potentially caused by a rise in runoff discharge rates and volume from Priority Development Projects (County of San Diego, 2011). The HMP was initially developed to meet the requirements of the 2007 Municipal Permit. The Monitoring Plan is defined in Chapter 8 of the HMP, and was updated by the Copermittees and accepted by the RWQCB in February 2014. The HMP requires monitoring with a final report due to the RWQCB in December 2016. Monitoring consists of channel sediment transport assessments and continuous flow monitoring of pre-project, post-project, and reference conditions. The RAs participate in this regional monitoring program through cost sharing and collaboration with other regional Copermittees.

### *Sediment Quality Monitoring*

Sediment quality monitoring is designed to assess compliance with the sediment quality receiving water limits applicable to enclosed bays and estuaries in accordance with the State Water Board's Water Quality Control Plan for Enclosed Bays and Estuaries of California – Part I Sediment Quality (Sediment Control Plan). Sediment quality monitoring includes the preparation of a Sediment Quality Monitoring Plan that satisfies the requirements of the Sediment Control Plan. The requirements of the sediment quality monitoring are:

- Elements required under Sections VII.D and VII.E of the Sediment Control Plan
- Quality Assurance Project Plan
- Schedule for completion of sample collection, analysis, and reporting

The RAs propose to conduct one round of sediment sampling during each Permit term. The second required round of sampling will be satisfied by conducting additional follow-up sampling in the vicinity of possibly impacted sites identified in the first round. The Sediment Quality Monitoring Plan and Quality Assurance Project Plan describe detailed proposed monitoring procedures and analytical methods, which are illustrative and may change on the basis of site environmental conditions and updated methodologies.

### *TMDL Monitoring*

TMDL provisions, schedules, and monitoring requirements are provided in Attachment E of the MS4 Permit. The purpose of the monitoring program is to track progress toward achieving compliance with interim and final TMDL numeric targets. The Bacteria TMDL in Permit Attachment E.6 is applicable to the San Marcos HA. Monitoring is designed to meet compliance with the monitoring requirements of the TMDL. Compliance monitoring during wet and dry weather will be conducted each year at the AB411 monitoring site (EH-420) located within the Pacific Ocean shoreline segment at Moonlight State Beach. This TMDL compliance monitoring site is shown on Figure 12.

See Section 3.5.5, San Marcos HA for more information regarding TMDL monitoring.

### *Long-Term Water Quality Monitoring at Loma Alta Slough*

To assess progress toward achieving the interim and final numeric goals, the City of Oceanside, in cooperation with the Loma Alta HA RAs, will spearhead a long-term water quality monitoring program in Loma Alta Slough. This effort is consistent with RWQCB Resolution No. R9-2014-0020, and the monitoring plan is based on RWQCB Tentative Investigative Order No. R9-2014-0020 that the Resolution replaced. Currently, a detailed Monitoring Plan and associated Quality Assurance Project Plan (QAPP) are being developed to detail the study objectives, schedule, methods, analysis, and reporting activities. The final Monitoring Plan and QAPP is posted on Project Clean Water: [www.projectcleanwater.org](http://www.projectcleanwater.org).

### *Flow and Water Quality Monitoring at Upper San Marcos Creek*

To assess progress toward achieving the interim and final numeric goals related to nutrients, the County of San Diego in collaboration with the cities of San Marcos and Escondido, will determine long-term water quality monitoring needs in Upper San Marcos HA. This monitoring will be described in the Monitoring and Assessment Plan currently under development. The temporary watershed assessment station (SM-TWAS-1a/b) located in the Upper San Marcos HA has been monitored regularly in wet and dry weather since 2008 and was used to establish the baseline for the WQIP nutrient goal. Continuous flow monitoring and annual wet event monitoring will continue at the SM-TWAS-1a, or another site as appropriate, in order to calculate event and annual nutrient loads.



## 2.7 Assessment

Assessment is the link between data collection, i.e. water quality monitoring and program implementation results, and providing rationale for program modifications through the iterative process. By evaluating data and information from program implementation and then comparing results to goals, benchmarks and/or previous results, RAs can assess their programs' functionality and effectiveness. Based upon the assessments, RAs can make determinations as to whether adaptations to the programs are appropriate.

Through assessment of collected data and information, the RAs intend to answer the following questions:

- Was the program implemented according to plan?
- What are the overall efforts by each RA to implement the WQIP?
- Should PWQCs and/or HPWQCs be modified?
- What is the status of progress toward achieving the numeric goals and schedules?
- Are goals appropriate and useful in measuring progress towards water quality improvements?
- Are RAs making progress towards goals at a rate conducive to the schedules developed?
- Should goals and schedules be modified?
- What is the status of progress toward addressing the HPWQCs?
- Are there program alternatives, including strategies, that are more effective or efficient than those implemented or planned for implementation?
- Should alternative/optional strategies be implemented?
- Are there current strategies that should be eliminated from the WQIP and JRMPs?

Based on the assessments and answers to these questions, the plan components may need to be modified to accommodate the feedback received through the monitoring and assessment. These potential modifications were discussed in Section 2.4.

Descriptions of the various assessments are provided below.

### 2.7.1 JRMP Program Assessments

As RAs implement their JRMPs, they implement tracking mechanisms and reporting systems for collecting a significant amount of data and information for program assessment. JRMP program assessments can be used to determine how effective and efficient program strategies are with respect to accomplishing the desired outcome of strategy implementation.

- Using the data and information collected through program monitoring, RAs will determine whether the JRMPs were implemented as planned. When a program is not implemented as planned, the monitoring (data tracking) and assessments may not be appropriate for the strategies implemented.
- Evaluating the effectiveness of strategies has two parts:
  - Determining if the strategy achieves its intended function; and
  - Determining if the strategy is effective at improving water quality conditions using data collected during strategy implementation
- Determining the efficiency of implemented strategies for the purposes of prioritizing and planning for the use of strategies involves two evaluations:
  - Cost benefit analyses; and
  - Comparisons of relative performance of strategies based on data and information collected by RAs.

The RAs will review the data and information collected to assess their JRMP programs and evaluate effectiveness and efficiencies of the strategies implemented. Where appropriate, findings will be used to feed into the iterative process to make changes to program implementation as well as in strategic planning.

### 2.7.2 Regulatory and Policy Assessment

Information collected on regulatory changes or emerging changes will be assessed to determine potential impacts to the WQIP. Outcomes of the assessment may include changes to the process in which Priority Water Quality Conditions and Highest Priority Water Quality Conditions are identified. The findings will influence the iterative process.

### 2.7.3 Storm Drain Discharges Assessments

The MS4 outfall discharge assessments includes evaluating the dry weather monitoring data collected at the highest priority MS4 outfalls with persistent non-storm water flows and associated information from the illicit discharge detection and elimination (IDDE) program and the wet weather MS4 monitoring program. Details of the dry and wet weather MS4 data assessments are provided below. Each Responsible Agency will assess its MS4 monitoring programs individually and compile results annually as part of the Carlsbad WMA Water Quality Improvement Plan Annual Report.

#### 2.7.3.1 Dry Weather Outfall Assessments/Illicit Discharges

Each Responsible Agency will assess and report the progress of its Dry Weather MS4 Outfall Monitoring and IDDE program (required pursuant to Municipal Permit Provision E.2) toward effectively prohibiting non-storm water and illicit discharges into the MS4s within its jurisdiction. Prior to completing the assessments, each jurisdiction will compile available relevant data in a regionally consistent format including, but not limited to, the following:

#### Monitoring Data

- Field screening visual observations
- Non-storm water monitoring including water quality, observations, field measurements, and flow estimates
- Relevant historical dry weather data
- Reports or notifications of illicit discharges, illicit connections, or other sources of non-storm water from hotlines or other sources
- Follow up field investigations of source of flow
- Review of MS4 outfall inventories, drainage areas, or changes in land use

#### JRMP Information and Data

- Field screening visual observations
- Non-storm water monitoring including water quality, observations, field measurements, and flow estimates
- Relevant historical dry weather data
- Reports or notifications of illicit discharges, illicit connections, or other sources of non-storm water from hotlines or other sources
- Follow up field investigations of source of flow
- Review of MS4 outfall inventories, drainage areas, or changes in land use

Table 16 presents the non-storm water pollutant discharges reduction assessments, suggested evaluation processes and potential outputs for each element.

**Table 16: Dry Weather MS4 Outfall Assessment Evaluation Process and Potential Outputs**

Non-storm water Assessments	Process of Evaluation	Potential Output(s)
Assessment 1: Progress toward effectively prohibiting non-storm water and illicit discharges into the MS4 within each jurisdiction	<ol style="list-style-type: none"> <li>1. Categorize flows as dry, persistent, transient, or undetermined based on historic and current field screening data.</li> <li>2. For transient and persistent flows, identify the known and suspected controllable sources, as feasible, and which sources were reduced or eliminated.</li> <li>3. Based on two previous steps, evaluate any modifications to field screening locations or frequency necessary to identify and eliminate sources of persistent flows. Reprioritization of outfalls may occur if one of the following conditions is met: <ol style="list-style-type: none"> <li>a. Non-storm water discharges have been effectively eliminated for three consecutive monitoring events or</li> <li>b. Source(s) of the persistent flows have been identified as not an illicit or a source of pollutants or</li> <li>c. Pollutants in the persistent flow do not exceed NALs or</li> <li>d. The threat to water quality has been reduced by the Responsible Agency</li> </ol> </li> </ol>	<p>Number of sources reduced and eliminated.</p> <p>Updated MS4 outfall inventory to reflect current flow status, outfalls removed or added from field screening program.</p> <p>List of program modifications.</p>
Assessment 2: Rank and prioritize MS4 outfalls	<ol style="list-style-type: none"> <li>1. Assess threat to receiving water quality from major MS4 outfalls based on available water quality data. Compare dry weather water quality data to relevant NALs, Highest and Focused Priorities (water quality objectives, 303(d) List or ESAs), and discharge prohibitions, as applicable.</li> <li>2. Identify pollutants from sources or land uses known to exist within the area, drainage basin, or watershed that discharges to the portion of MS4 within its jurisdiction.</li> <li>3. Rank MS4 outfalls according to threat to water quality using the metrics established under the transitional monitoring program.</li> </ol>	<p>Revised prioritized list of major MS4 outfalls.</p> <p>List of modifications to major MS4 outfalls monitored under Provision D.2.b.</p> <p>Revised prioritization metrics, as applicable.</p>
Assessment 3: Identify known and suspected sources contributing to numeric action limit exceedances at highest-ranked MS4 outfalls	<ol style="list-style-type: none"> <li>1. Compare dry weather water quality data from major outfalls to relevant NALs (completed in Assessment 2).</li> <li>2. For those exceeding NALs, use visual observation, inspection data, land use data, complaints, and other reports to identify potential sources in the outfall drainage area.</li> </ol>	<p>List of known and suspected sources for each highest-ranked MS4 outfall</p> <p>Summary of NAL exceedances per HU, and applicable follow-up actions.</p> <p>List of follow up actions and whether those actions have resulted in lower pollutant concentrations or identification of confirmed or suspected sources, if data are available.</p> <p>Revise internal follow-up procedures, as necessary, to increase effectiveness of follow-up actions as part of adaptive management.</p>

Non-storm water Assessments	Process of Evaluation	Potential Output(s)
Assessment 4: Estimate volumes and loads of non-storm water discharges	<ol style="list-style-type: none"> <li>1. Compile dry weather water quality and flow data from major MS4 outfalls with persistent flow per jurisdiction.</li> <li>2. Annual rainfall data representative of the watershed to define wet versus dry days for the monitored year.</li> <li>3. Calculate or estimate annual non-storm water volume and pollutant loads collectively discharged from each jurisdiction's major MS4 outfalls to receiving waters.</li> <li>4. Estimate the percent contribution from each known source for each MS4 outfall (as identified in Assessment 3).</li> <li>5. Calculate or estimate annual non-storm water volume and pollutant loads collectively discharged from non-storm water not subject to the Copermittee's legal authority.</li> </ol>	Total estimated volume or load of non-storm water discharges per jurisdiction and by HA
Assessment 5: Identify data gaps	Review assessment methodology and determine additional data needed to improve evaluation and identify and eliminate non-storm water discharges.	List of potential modifications to the monitoring, Jurisdictional Runoff Management Program activities, or strategies.

**Note:**

Regional formats, data evaluation processes, and suggested outputs are provided and are subject to change based on program refinements and lessons learned from implementation of program elements as part of the adaptive management process.

### 2.7.3.2 Wet Weather Outfall Monitoring Assessments

Each Responsible Agency will assess and report the results of its Wet Weather MS4 Outfall Monitoring and evaluate progress toward reducing pollutant loading during wet weather. Prior to completing the assessments, each Jurisdiction will compile available relevant data, as applicable, in a regionally consistent format to complete the storm water discharge assessment. Table 17 presents the storm water pollutant discharge reduction assessments, example evaluation processes and suggested outputs for each element.

**Table 17: Wet Weather MS4 Outfall Assessment Evaluation Process and Potential Outputs**

Storm Water Assessments	Process of Evaluation	Potential Output(s)
Assessment 1: Estimate volumes and loads of storm water discharges	<ol style="list-style-type: none"> <li>1. Compile wet weather water quality and flow data from monitored outfalls for the monitoring year and compare across multiple years of data.</li> <li>2. Use rainfall data representative of the watershed to define wet versus dry days for each monitored year.</li> <li>3. Calculate or estimate annual non-storm water volume and pollutant loads collectively discharged from each jurisdiction's monitored MS4 outfalls to receiving waters for each storm event.</li> <li>4. Estimate the percent contribution of storm water volumes and pollutant loads discharged from each land use type within each hydrologic subarea or within each major MS4 outfall to receiving waters.</li> <li>5. Evaluate modifications to wet weather MS4 monitoring locations or frequency necessary to identify pollutants in storm water discharges in the WMA.</li> </ol>	<p>Total estimated volumes and loads of storm water discharges per jurisdiction and for the Carlsbad WMA.</p> <p>Estimated percent contribution from each land use type within each HA or major MS4 outfall.</p> <p>Modifications to the wet weather MS4 outfall monitoring locations and frequencies, as needed and based on factors such as funding, safety and site accessibility.</p>
Assessment 2: Identify known and suspected sources contributing to SAL exceedances at highest-ranked MS4 outfalls	<ol style="list-style-type: none"> <li>1. Compare wet weather water quality data from monitored outfalls to relevant SALs.</li> <li>2. For those exceeding SALs, use relevant visual observation, inspection data, land use data, IC/ID reports to identify potential sources present in the outfall drainage area in the wet season.</li> <li>3. Re-evaluate strategies and update other assumptions used to develop the WQIP under the adaptive management approach.</li> </ol>	<p>Summary of SAL exceedances within the WMA, and applicable follow-up actions.</p> <p>List of known and suspected wet weather point sources for each highest-ranked MS4 outfall, as applicable</p> <p>List of follow up actions and whether those actions have resulted in lower pollutant concentrations or identification of confirmed or suspected sources, if data are available.</p> <p>Revise internal follow-up procedures, as necessary, to increase effectiveness of follow-up actions as part of adaptive management.</p>
Assessment 3: Identify data gaps	Review assessment methodology and determine additional data needed to improve evaluation of non-storm water discharges.	List of potential modifications to the monitoring, Jurisdictional Runoff Management Program activities and response actions, or strategies.

**Note:**

Regional formats, data evaluation processes, and suggested outputs are provided and are subject to change based on program refinements and lessons learned from implementation of program elements as part of the adaptive management process.

### 2.7.3.3 Report of Waste Discharge

As part of the ROWD, RAs will evaluate dry and wet weather MS4 outfall monitoring data collected.

Table 18 presents the evaluation process and potential output for each element.

**Table 18: ROWD Assessments Evaluation Process and Potential Outputs**

ROWD Assessments		Process of Evaluation	Potential Output(s)
Non-storm water Assessments	Assessment 1: Identification of reductions and progress in achieving reduction in non-storm water and illicit discharges from the MS4	<ol style="list-style-type: none"> <li>1. Compile number of sources of non-storm water and illicit discharges reduced and eliminated by all jurisdictions in the WMA over the permit term.</li> <li>2. Assess progress by comparing to previous permit terms.</li> </ol>	Percent increase or decrease in number of sources reduced or abated for the entire WMA this permit term.
	Assessment 2: Assess effectiveness of strategies toward reducing or eliminating non-storm water and pollutant loads from the MS4 to receiving waters by Jurisdiction	<ol style="list-style-type: none"> <li>1. Compare data from pre- and post- project or focused area to evaluate potential effects of enhanced Water Quality Improvement Plan strategies, as available</li> <li>2. If possible, estimate the pollutant load reduction attributable to specific water quality strategies.</li> </ol>	<p>Summary of pre-project (baseline) data and post-project data</p> <p>Summary of load reductions per jurisdiction by HU for highest and focused priorities.</p> <p>List of strategies that may support pollutant load reductions and those that don't, based on data collected.</p>
	Assessment 3: Identify modifications necessary to increase the effectiveness of strategies toward reducing or eliminating non-storm water and pollutant loads from the MS4 to receiving waters by Jurisdiction	Review assessment methodology and determine additional data needed to improve evaluation and identify and eliminate non-storm water discharges.	List of potential modifications to the Monitoring and Assessment Program, Jurisdictional Runoff Management Program activities, or strategies. Recommendations for programmatic adjustments of strategies and schedules.
Storm Water Assessments	Assessment 1: Identification of reductions and progress in achieving pollutant load reductions from different land uses and/or drainage areas discharging from the MS4	<ol style="list-style-type: none"> <li>1. Compile total estimated volume or load of non-storm water discharges by drainage area, land use, or other relevant assessment metric for the WMA over the permit term</li> <li>2. Assess progress by comparing pollutant loads by land use and/or drainage areas over a minimum of three years to determine short-term trends over the five years of implementation.</li> </ol>	<p>Percent allocation of volume or load based on percent of land use per HA and by WMA.</p> <p>Trend analysis, if sufficient data points are available, based on percent allocation of volume or load.</p>
	Assessment 2: Identify modifications necessary to increase the effectiveness of strategies toward reducing pollutants in storm water discharges from the MS4 to receiving waters in the WMA to the MEP	<ol style="list-style-type: none"> <li>1. Compare data from pre-post project or focused area to control area in order to evaluate potential effects of enhanced Water Quality Improvement Plan strategies.</li> <li>2. If possible, estimate the pollutant load reductions attributable to specific water quality strategies.</li> </ol>	<p>Summary of pre-project (baseline) data and post-project data.</p> <p>Summary of load reductions per jurisdiction by HA for highest and focused priorities.</p> <p>List of strategies that may support pollutant load reductions and those that don't, based on data collected.</p>
	Assessment 3: Identify modifications necessary to increase the effectiveness of the water quality improvement strategies implemented in the WMA toward reducing pollutants in storm water discharges from the MS4s to receiving waters to MEP	Review assessment methodology and determine additional data needed to improve evaluation and identify and eliminate storm water discharges.	List of potential modifications to the monitoring, Jurisdictional Runoff Management Program activities, or strategies. Recommendations for programmatic adjustments of strategies and schedules.

Note: Regional formats, data evaluation processes, and suggested outputs are provided and are subject to change based on program refinements and lessons learned from implementation of program elements as part of the adaptive management process.



## 2.7.4 Special Studies Assessments

As part of the WQIP Annual Report, the RAs will evaluate the results and findings from the special studies. Results from each special study will be reported individually based on its implementation schedule. Findings from each active special study will be compiled annually as part of the Carlsbad WMA WQIP Annual Report to complete the special study assessments described below. If a special study is not being implemented, then a status update and schedule for implementation will be provided in the Annual Report.

Table 19 presents the special study assessments, the planned special studies that may be implemented, and potential outputs for each element.

**Table 19: Special Studies Assessments Evaluation Process and Potential Outputs**

Special Studies Assessments	Planned Special Studies	Potential Outputs (dependent on study schedule of implementation)
Assessment 1: Assess relevance of each special study to the Participating Agencies' characterization of receiving water conditions	Regional Reference Studies will characterize natural 'reference' concentrations of bacteria in streams and beaches.	Data to support modification of TMDL compliance such as numeric targets including water quality objectives or the allowable percent exceedance frequency.
	Loma Alta Nutrient Special Study will characterize receiving water conditions during the critical condition.	Loma Alta Nutrient Special Study data will be used to track change in receiving water conditions.
	Bight '13 – San Marcos HA Microbiology Drainage Water Special Study will monitor San Marcos HA paired with Moonlight Beach.	Bight '13 – San Marcos HA Microbiology Drainage Water Special Study will evaluate the relationship between beach water quality and input from the watershed.
Assessment 2: Understand sources of pollutants and/or stressors	Regional Reference Studies will characterize natural 'reference' concentrations of bacteria in streams and beaches during wet and dry weather conditions.	Regional Reference Studies data may be used to understand how natural background levels of bacteria during wet and dry weather conditions may contribute to exceedances.
	Dry Weather Special Study will characterize persistent dry weather flows from high priority major MS4 outfalls.	Dry Weather Special Study data may be used to guide further investigations of sources.
	Loma Alta Nutrient Special Study will characterize watershed input via Loma Alta Creek to Loma Alta Slough.	Loma Alta Nutrient Special Study will characterize the magnitude and extent of nutrient loading from Loma Alta Creek. After multiple years of implementation, data may be used to guide investigations of potential controllable versus uncontrollable sources.
	Clean Beaches Initiative Grant – Fecal Indicator Bacteria (FIB) Microbial Source Identification Study for Buccaneer Beach and Loma Alta Creek	FIB Microbial Source Identification Study will provide an understanding of the main FIB sources and natural processes affecting FIB distribution and persistence during dry and wet weather conditions.
	Bight '13 – San Marcos HA Microbiology Drainage Water Special Study will characterize potential watershed inputs of human fecal contamination.	Bight '13 – San Marcos HA Microbiology Drainage Water Special Study will characterize the frequency and magnitude of human signal during wet and dry weather conditions.
Assessment 3: Control and reduce the discharges of pollutants from the MS4 outfalls to receiving waters	Dry Weather Special Study will characterize persistent dry weather flows from MS4.	Dry Weather Special Study data may be used to develop an action plan to reduce or control identified sources. Data from the Dry Weather Special Study will also be used to help document pre-restoration conditions of the Spruce Street Channel prior to its confluence with the Escondido Channel
	Loma Alta Nutrient Special Study will characterize Loma Alta Creek.	Loma Alta Creek data may be used to guide monitoring of MS4 outfalls located upstream.
	Bight '13 – San Marcos HA Microbiology Drainage Water Special Study will assess human fecal contamination at a location in the San Marcos HA.	Bight '13 – San Marcos HA Microbiology Drainage Water Special Study data may be used to guide follow up source investigations in the San Marcos HA.

Special Studies Assessments	Planned Special Studies	Potential Outputs (dependent on study schedule of implementation)
Assessment 4: Identify any necessary modifications or updates to the WQIP based on Special Study results or findings	Regional Reference Studies Dry Weather Special Study Loma Alta Nutrient Special Study FIB Microbial Source Identification Study Bight '13 – San Marcos HA Microbiology Drainage Water Special Study	Data may be used to guide modifications to monitoring, source investigations, JRMP activities or response actions, or strategies.

### 2.7.5 Receiving Waters Assessment

The assessment of receiving waters involves evaluating the physical, chemical, and biological conditions of the receiving waters and sediments. The RAs will assess the status and trends of receiving water quality conditions in coastal waters, enclosed bays, harbors, estuaries, and streams in the Carlsbad WMA, once per permit cycle. The results from these assessments may be presented as part of a WQIP Annual Report or in the ROWD. Prior to completing the assessments, each jurisdiction will compile relevant data in a regionally consistent format including, but not limited to, the following:

- Wet and dry weather chemical, biological, and physical data collected under Long-term receiving water, regional monitoring, and sediment monitoring programs
- Other available and relevant wet and dry weather data at receiving water locations collected under programs such as TMDL Monitoring or Special studies
- Relevant historical wet and dry weather data at receiving water locations, and
- Results of Toxicity Identification Evaluations (TIEs) and/or Toxicity Reduction Evaluations (TREs), if applicable.

Once the jurisdictional data is collected into regionally consistent formats, the data will be compiled for the watershed assessment. Table 20 presents the receiving water quality assessments, evaluation processes and potential outputs for each element.

**Table 20: Receiving Water Assessment Evaluation Process and Potential Outputs**

Receiving Water Assessments	Process of Evaluation	Potential Output(s)
Assessment 1: Determine whether or not the conditions of the receiving waters are meeting the numeric goals established	Compare water quality data from Bacteria TMDL compliance locations collected during current and past monitoring years to TMDL interim and final numeric goals	Categorize goals as met, partially met, or currently not met, or alternative categories more specific to the relevant goal(s)
Assessment 2: Identify the most critical beneficial uses that must be protected to ensure the overall health of the receiving water	Use multiple lines of evidence prioritization methodology from applicable Water Quality Improvement Plan section to evaluate current state of receiving water quality conditions using more recent and updated data, including: <ul style="list-style-type: none"> <li>a. Compare receiving waters water quality data collected during current and past monitoring years to water quality benchmarks.</li> <li>b. Consider publicly available data</li> <li>c. Consider current regulatory drivers</li> <li>d. Evaluate MS4 contribution.</li> </ul>	Identify most critical beneficial uses Status of and potential changes to Priority Conditions and Highest Priority Conditions

Receiving Water Assessments	Process of Evaluation	Potential Output(s)
Assessment 3: Evaluate whether or not the critical beneficial uses identified under Assessment 3 are being protected	<ol style="list-style-type: none"> <li>1. For Priority Water Quality Conditions and High Priority Water Quality Conditions, compare current and historical data to water quality benchmarks and calculate a frequency of exceedances.</li> <li>2. Evaluate seasonal or temporal patterns in available water quality and flow data to determine when those critical beneficial uses are supported or impaired.</li> </ol>	Categorize Priority Conditions and Highest Priority Conditions as protected, likely protected, possibly impacted, likely impacted, or clearly impacted, or alternative categories depending on type of beneficial use.
Assessment 4: Identify short-term and/or long-term improvements or degradation of those critical beneficial uses	<ol style="list-style-type: none"> <li>1. Compare current and historical data to water quality benchmarks.</li> <li>2. Calculate a frequency of exceedances for each monitoring year. For short-term trends, use a minimum of three years of data and a minimum of five years to evaluate long-term trends.</li> </ol>	Statistical analysis of trends and recommended programmatic changes or enhancements
Assessment 5: Determine whether or not the strategies established in the WQIP contribute towards progress in achieving the interim and final numeric goals of the WQIP	Evaluate progress toward achieving interim and final numeric goals by HA or focus area as described in Section 3. Evaluate efficacy of strategies listed in Section 3.	Identify interim and final goals met, partially met, or not met by HA. List of potential modifications to monitoring or strategies.
Assessment 6: Identify data gaps in the monitoring data needed to conduct the above assessments	Review assessment methodology and determine additional data needed to improve evaluation and better characterize general health of beneficial uses.	List of potential modifications to the monitoring, Jurisdictional Runoff Management Plan activities, or strategies

**Note:**

Regional formats, data evaluation processes, and suggested outputs are provided and are subject to change based on program refinements and lessons learned from implementation of program elements as part of the adaptive management process.

### 2.7.6 Integrated Assessment

In order to make determinations of potential program changes, the iterative process needs to have a comprehensive assessment completed that integrates data from program implementation, water quality data, special studies and regulatory issues. The integrated assessment is intended to evaluate all of the moving parts of the WQIP together.

The RAs will utilize appropriate data and information collected to assess the following:

- Priority water quality conditions
- Numeric goals and schedules
- Water quality improvement strategies and schedules
- Water quality monitoring program, and
- Assessment program.

The outcomes of the integrated assessment will provide the iterative process as well as the basis for appropriate and necessary modifications to the WQIP.

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### 3 Hydrologic Area Implementation

Through the development of the Carlsbad WQIP, the Carlsbad WMA RAs identified HPWQCs and PWQCs, as described in Sections 2.1 and 2.2. Permit Provision B.2.c.(2) states “the Copermittees must identify the highest priority water quality conditions to be addressed by the Water Quality Improvement Plan, and provide a rationale for selecting a subset of the water quality conditions identified pursuant to Provision B.2.c.(1) as the highest priority”. (Order R9-2013-0001) As described in Section 1, the Carlsbad WMA is unique compared to other WMAs within the San Diego region because it is comprised of multiple HAs that drain to distinct discharge points via separate stream systems (Figure 14). Therefore, PWQCs and HPWQCs are identified for multiple HAs rather than for the entire WMA. The prioritization process for water quality conditions is described in Sections 2.1 and 2.2 of this WQIP. Using the identified process, each RA needs to establish their prioritization for water quality conditions and address conditions that demonstrate the highest threat to receiving water quality, or that most adversely affects the quality of receiving waters (based on the best available data within their jurisdictional boundaries). In addition, through the WQIP and adaptive management process, RAs are expected to analyze decision making and resource allocation and adapt goals, strategies and associated schedules, where needed, to improve upon program effectiveness. The iterative process is discussed in Section 2.4.

Each section below introduces one of the six HAs within the Carlsbad WMA. Each section includes HA-specific information for the identification of HPWQCs; interim and final numeric goals; strategies and schedules established by the RAs to address the HPWQCs and PWQCs; as well as HA-specific discussions of monitoring and assessment. For each HA, the document presents strategies to be implemented throughout the HA in tabular format. The table provides the strategies, RAs implementing the strategies, planned implementation schedules, target pollutants, conditions or stressors addressed, target sources, and target temporal extent. Numerous special studies and modeling efforts in other southern California watersheds have documented the multi-pollutant benefit that are achieved through strategy implementation and this is included where applicable in each HA’s strategy table. See Figure 13: Example HA Strategy Table below for an example strategy table.

## WATER QUALITY IMPROVEMENT STRATEGIES

- 1 **Strategies:** List of strategies to be implemented in Hydrologic Area.
- 2 **Jurisdictions:** Jurisdictions implementing strategy and location within HA.
- 3 **Target Sources:** Identified sources of pollution addressed by strategies.
- 4 **Target Pollutants, Stressor, or Condition:** Pollutant, stressor, or condition categories addressed by strategies. HPWQC highlighted in yellow and PWQCs highlighted in green.
- 5 **Target Temporal Benefit:** Identifies temporal condition(s) addressed by strategies.
- 6 **Implementation Schedule:** When strategy will be implemented.
- 7 **Planned Jurisdictional and Optional Strategies:** Core jurisdictional program strategies (Permit Provisions E.2-E.7) and optional strategies planned to be implemented in the HA.
- 8 **Additional Optional Strategies:** BMPs, incentives, or programs that will be triggered for implementation in response to specific conditions.
- 9 **Watershed Management Area Strategies:** Regional or multi-jurisdictional BMPs, incentives, or programs that may be implemented.

1	Water Quality Improvement Plan Strategies	2 Jurisdiction/Area			3 Target Sources								4 Target Pollutant, Stressor, or Condition								5 Target Temporal Benefit		6 Implementation Schedule										
		Jurisdiction A	Jurisdiction B	Jurisdiction C	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)		
7	PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b))																																
1	Strategy A	HA Wide	-	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
2	Strategy B	HA Wide	HA Wide	Basin 2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
3	Strategy C	Basin 3	-	-						•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
4	Strategy D	HA Wide	Basin 1	-			•						•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
8	ADDITIONAL OPTIONAL STRATEGIES (PERMIT SECTION B.3.b. (1) (b)) (more information on these strategies and criteria for initiating them can be found in Section 3.1.5.2.2)																																
5	Strategy E	HA Wide	HA Wide	HA Wide	•	•		•			•		•	•	•	•	•	•	•	•	•	•	•	•		Based on appropriate criteria for initiating (See Section 3.X.5.2.2 for information)							
6	Strategy F	-	Basins 1 & 4	Basin 2							•		•	•		•	•	•	•	•	•	•	•	•		Based on appropriate criteria for initiating (See Section 3.X.5.2.2 for information)							
7	Strategy G	Basins 3 & 6	HA Wide	Basin 2							•		•	•	•	•	•	•	•	•	•	•	•	•		Based on appropriate criteria for initiating (See Section 3.X.5.2.2 for information)							
9	WATERSHED MANAGEMENT AREA STRATEGIES (PERMIT SECTION B.3.b. (2))																																
8	Strategy H	HA Wide	HA Wide	HA Wide																						Based on appropriate criteria for initiating							
9	Strategy I	HA Wide	HA Wide	HA Wide																						Based on appropriate criteria for initiating							

<sup>1</sup> Optional Strategies. Note that where optional strategies are listed under the Planned Jurisdictional Strategies category, Copermittees have committed to implementing them, so no additional detail on circumstances that would trigger those optional strategies is necessary.

Figure 13: Example HA Strategy Table



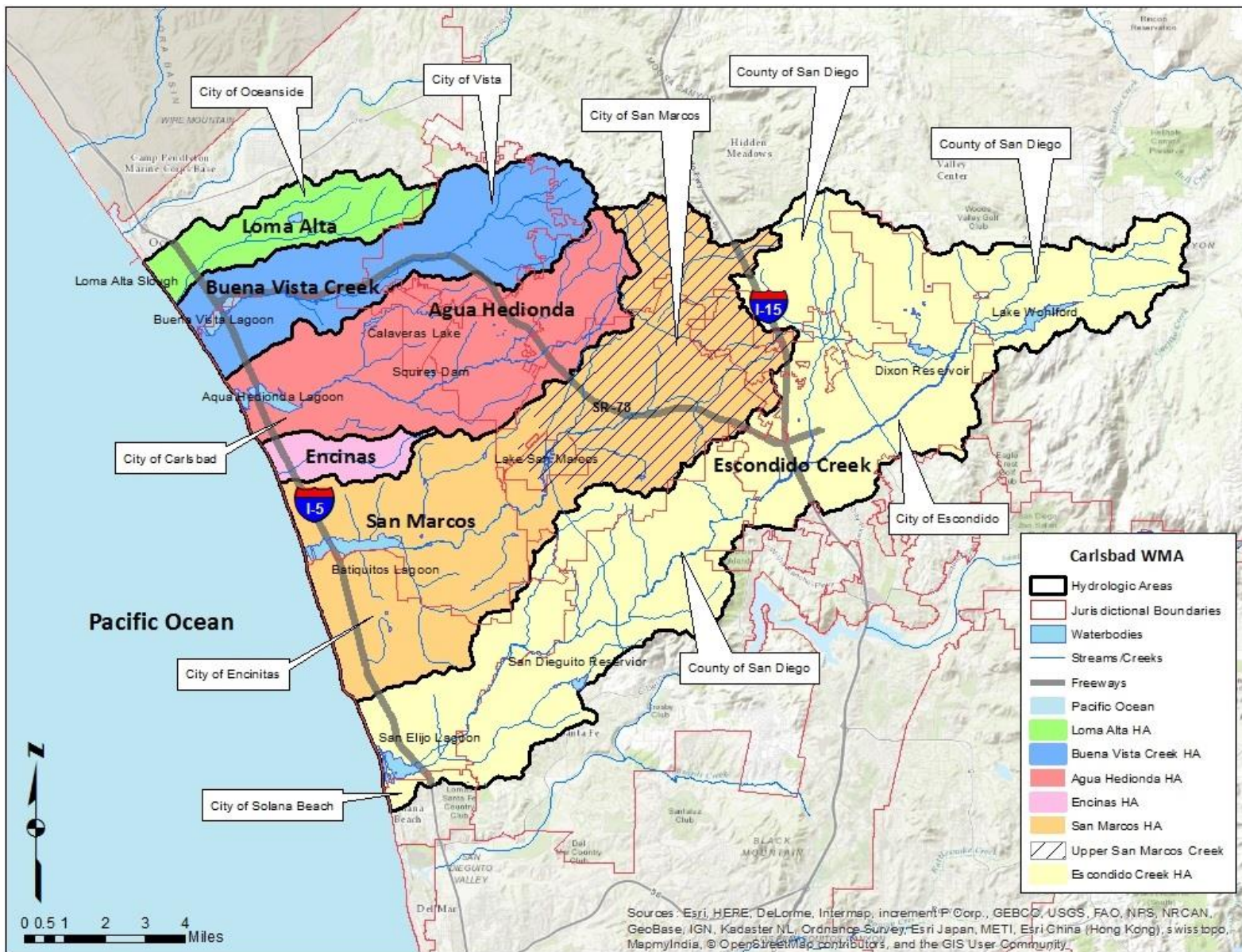


Figure 14: Carlsbad WMA Map

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### 3.1 Loma Alta HA (904.1)

The Loma Alta HA is the northernmost HA of the Carlsbad WMA. It is approximately 6,300 acres in area, comprising 5 percent of the WMA. The HA extends inland about 7.3 miles and the highest elevation within the drainage area is 460 feet above mean sea level. The primary receiving waters in the HA are Loma Alta Creek, which drains into the Loma Alta Slough and the Pacific Ocean. The HA is located almost entirely inside the City of Oceanside with less than 4 percent in the City of Vista and a portion of two parcels in the County of San Diego (Figure 15).

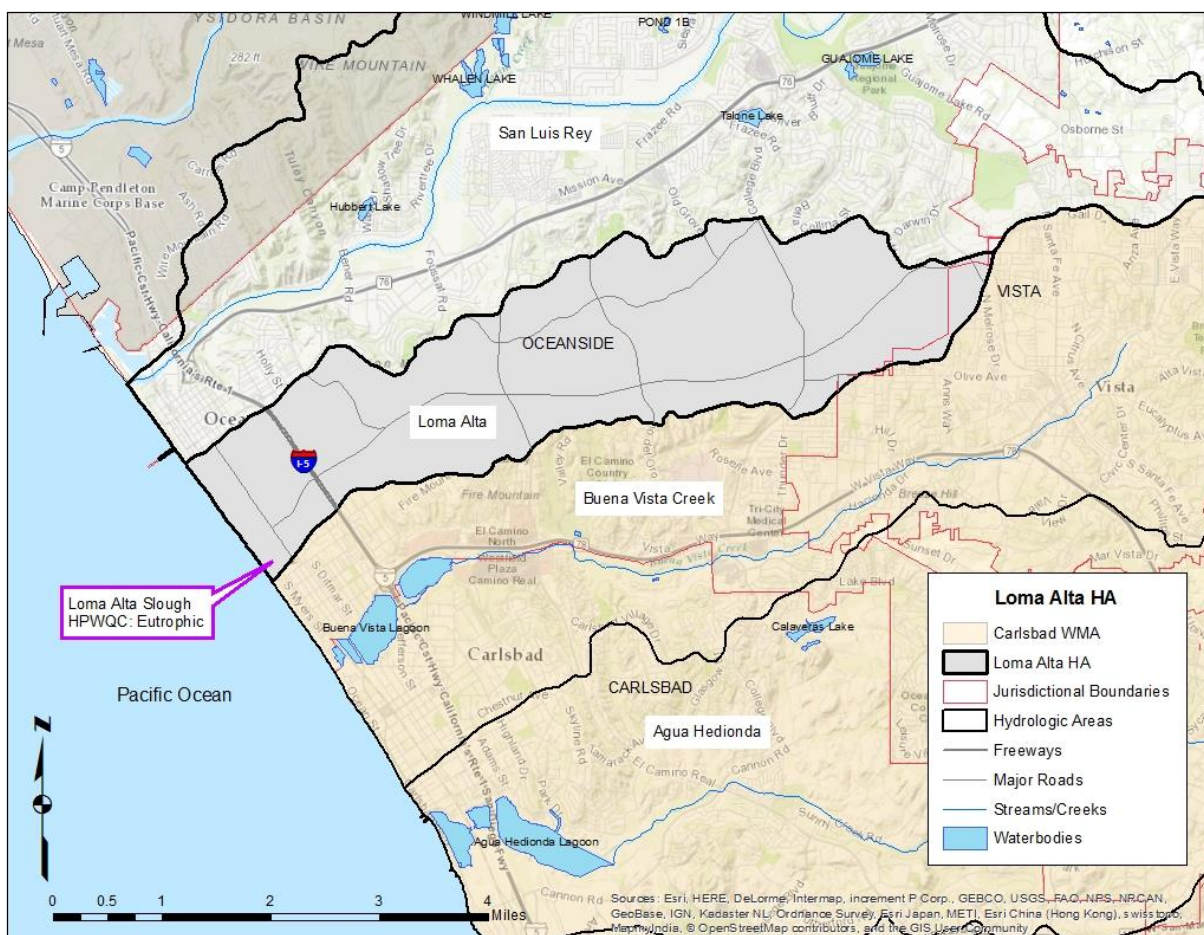


Figure 15: Loma Alta Hydrologic Area

The primary receiving waters in the HA are Loma Alta Creek, which drains into the Loma Alta Slough, and ultimately the Pacific Ocean.

Loma Alta Creek begins as rising springs just west of Melrose Drive in the City of Vista and flows to Loma Alta Slough (Slough). Loma Alta Creek flows parallel to Oceanside Boulevard and the Slough is located north of Buccaneer Beach Park. The slough is a 107-acre coastal estuarine wetland that has intermittent tidal influence, based upon the amount of sand deposition that occurs at the mouth of the slough on the beach. The Slough is a highly valued resource within the community and home to wildlife and many species of birds.





Loma Alta Slough: Buccaneer Beach Park Recreational Use

There are three tributaries to Loma Alta Creek. The only named tributary is Garrison Creek which parallels Mesa Drive west of El Camino Real and enters Loma Alta Creek downstream of the two unnamed tributaries. Much of Loma Alta and Garrison Creeks have been modified throughout the years, with the use of fully or partially concrete-lined channels to stabilize the creek-bed slopes. The impact of this channelization has been the fragmentation of riparian habitat corridors and the reduction in the benefits of natural channel and wetland features.

Nearly 80 percent of the watershed is developed (21 percent is open space or undeveloped) and is comprised of the following land uses: residential (31 percent), industrial (9 percent), commercial (5 percent) and roads and railway (18 percent). All of these land uses are potential sources of pollutants and have potential impacts on the water quality discharged from the RAs storm drain system (Figure 16).



Loma Alta Creek: Concrete Lined at Coast Highway

The remainder of this section is organized to summarize:

- Water quality conditions within the hydrologic area
  - conditions that are a priority to the RAs
  - identification of the highest priority water quality condition(s)
- Identification of the potential sources of pollutants and/or stressors that impact the highest priority water quality condition(s)
- Identification of goals and schedules achieving the goals associated with the highest priority water quality condition(s)
- Identification of the strategies and schedules to be implemented by the RAs to effectively prohibit non-storm water discharges, reduce pollutants and storm water discharges from the RA's storm

drain systems, protect the beneficial uses of receiving waters from storm drain discharges, and/or achieve the goals identified.

### 3.1.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess the conditions of water quality in the Loma Alta hydrologic area, and to prioritize the identified water quality conditions.

These efforts included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Holding facilitated workshops to receive input from the public and the watershed consultation panel, and
- Reviewing and analyzing the available data and information as summarized in Section 2.1 of this WQIP.

Based upon review and analysis of the gathered data and information, the following constituent groups were found to be of *low* priority for receiving waters within the Loma Alta hydrologic area:

- Oil & grease;
- Metals;
- Organics;
- Pesticides under dry conditions;
- Toxicity under wet conditions;
- Nutrients under wet conditions; and
- Sediment related impacts under dry conditions.

#### 3.1.1.1 Priority Water Quality Conditions

The RAs used the information gathered to assess the receiving water conditions (refer to Section 2.1, Table 3 and the impacts from MS4 sources (refer to Section 2.1, Table 4), to develop a “list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters” (Permit Provision B.2.c.).

The assessment of data and information for the Loma Alta HA identified riparian habitat, trash, eutrophic conditions at the Loma Alta Slough, indicator bacteria in the Loma Alta Slough, toxicity in Loma Alta Creek, and indicator bacteria at the Pacific Ocean shoreline at Loma Alta Creek Mouth as PWQCs for the HA (Table 21).

**Table 21: Loma Alta HA Priority Water Quality Conditions**

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody
Loma Alta Slough	Loma Alta Hydrologic Area	904.10	Eutrophic	Marine Habitat (MAR)	Dry Weather	Oceanside, Vista, San Diego County
Loma Alta Slough	Loma Alta Hydrologic Area	904.10	Indicator Bacteria	Contact Water Recreation (REC-1)	Dry and Wet Weather	Oceanside, Vista, San Diego County
Loma Alta Creek	Loma Alta Hydrologic Area	904.10	Toxicity	Warm Freshwater Habitat (WARM);	Dry Weather	Oceanside, Vista, San Diego County
Pacific Ocean Shoreline at Loma Alta Creek Mouth	Loma Alta Hydrologic Area	904.10	Indicator Bacteria	REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County
All water bodies within the Carlsbad WMA	All	All	Trash	All	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>1</sup>
All water bodies within the Carlsbad WMA	All	All	Riparian Habitat Degradation	WARM;REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>1</sup>

<sup>1</sup>This is a watershed-wide PWQC and all jurisdictions are listed. However, only the Cities of Oceanside and Vista and County of San Diego are located within the Loma Alta HA.



### 3.1.1.2 Highest Priority Water Quality Conditions

Once the PWQCs were identified, the next step was to “identify the HPWQCs to be addressed by the WQIP and provide the rationale for selecting a subset of the [priority] water quality conditions identified”. The RAs established the process outlined in Section 2.2 to identify the HPWQCs within the Carlsbad WMA, and Figure 7 provides an illustration of the process. Although a subset of priority water quality conditions are identified as the highest priority condition(s), other priority water quality conditions are expected to be positively impacted through strategies identified for implementation by the RAs (LTEA, 2011 and CASQA). Table 25 identifies the multi-pollutant benefits of the strategies to be implemented within the HA.

Table 22 lists the HPWQC for the Loma Alta HA that was identified using the process outlined in Section 2.2. Eutrophic conditions in the Loma Alta Slough between May and October, of each year is the HPWQC. The rationale for identifying the HPWQC is further described below.

A draft TMDL for phosphorus in Loma Alta Slough has been in development since 2008 by the RWQCB to address the HPWQC eutrophic condition. The draft TMDL states that phosphorous inputs from the City of Oceanside’s MS4 non-storm water discharges are partially responsible for the summertime (May – October) growth of macroalgae in the Slough, which contributes to the eutrophic impairment<sup>8</sup>. Implementation of the draft phosphorus TMDL was postponed in 2014 in favor of the WQIP planning process, in which the goals and strategies described in the sections below will be utilized to restore the beneficial uses of the Slough. By using the WQIP strategies described herein, coupled with a rigorous long-term investigative water quality monitoring program in Loma Alta Slough, the City of Oceanside has committed to document its progress toward attaining the numeric goals for the HPWQC eutrophic condition as listed in Section 3.1.3. These commitments were outlined in RWQCB Resolution No. R9-2014-0020<sup>9</sup>. Further information regarding the HPWQC numeric goals and the long-term water quality monitoring plan can be found in Section 3.1.3 and Section 3.1.5, respectively.

In addition to the regulatory driver, the following is a summary of supporting information and lines of evidence that support the HPWQC for the Loma Alta HA:

- Loma Alta Slough is a valued resource within the community, providing for non-contact water recreation activities (REC-2) activities and wildlife habitat (WILD), and rare, threatened, or endangered species habitat (RARE)
- LTEA: Dry weather data supports eutrophic conditions
- Annual Regional Monitoring: Dry weather data supports eutrophic conditions
- Public data call identifies eutrophic conditions as a pollutant of concern
- 303(d) listing for eutrophication in the Loma Alta Slough
- Draft Phosphorous TMDL for Loma Alta Slough and Resolution R9-2014-0020

[see section 2 of this WQIP for further information on LTEA, annual regional monitoring, and public data call]

**Table 22: Loma Alta HA Highest Priority Water Quality Condition**

Hydrologic Area	Applicable Receiving Water*	Highest Priority Water Quality Condition (Condition, Pollutant, or Stressor)	Temporal Extent
Loma Alta	Loma Alta Slough	Eutrophic (nutrients)	Between May and October

<sup>8</sup> California Regional Water Quality Control Board San Diego Region – Phosphorus Total Daily Maximum Daily Load for Loma Alta Slough, Oceanside California – Draft May 2014 Staff Report

<sup>9</sup> California Regional Water Quality Control Board San Diego Region – Resolution No. R9-2014-0020 – Resolution of Commitment to an Alternative Process for Achieving Water Quality Objectives for Biostimulatory Substances in Loma Alta Slough.

### 3.1.2 Loma Alta HA Sources

As noted in Section 2.2, the pollutants found in wet weather urban runoff are generally associated with land uses in the tributary areas. Rainfall runoff mobilizes and transports pollutants from areas that are collectively associated with particular land uses. This is opposed to the pollutants found in dry weather urban runoff that are generally associated with identifiable-source discharges such as residences, construction sites, or commercial facilities.

The RAs within Loma Alta have identified and targeted land uses and areas (residential) that are suspected of causing and contributing to nutrient loading within the HA. Figure 16 presents the land uses within the Loma Alta HA. These areas and land uses are described in more detail in strategies included in Section 3.1.4.1.

In addition to the identified land uses, Table 23 presents a list of inventoried sources and their association with HPWQCs and PWQCs, and pollutant loading potential (2011 LTEA). The HPWQC is indicated as eutrophic conditions from nutrients (in yellow) and likely stems from the following sources (in blue): animal facilities, nurseries/greenhouses, parks and recreation, and residential areas. The associations identified in the below table are based on the LTEA process developed for associating known pollutant sources with the potential for those sources to generate pollutant loadings for the identified pollutant categories. The Loma Alta HA was analyzed using the most recent available data to quantify the inventoried sites/facilities that are likely to contribute to eutrophic conditions, helping to shape strategies within this area. Furthermore, other PWQCs, bacteria and toxicity in this HA, are identified (in green columns) to further highlight that similar sources have the potential to generate pollutants related to the HPWQC and PWQCs. The HPWQC will have associated load reductions. The strategies implemented within the HA are intended to address the HPWQC and also PWQCs.

While the 2011 LTEA did not analyze or include riparian habitat degradation, the source and pollutants included in the table have the potential to degrade riparian habitat within the HA by contributing pollutants into the MS4. Increased impervious surfaces and hydromodification impacts are also sources contributing to riparian habitat degradation

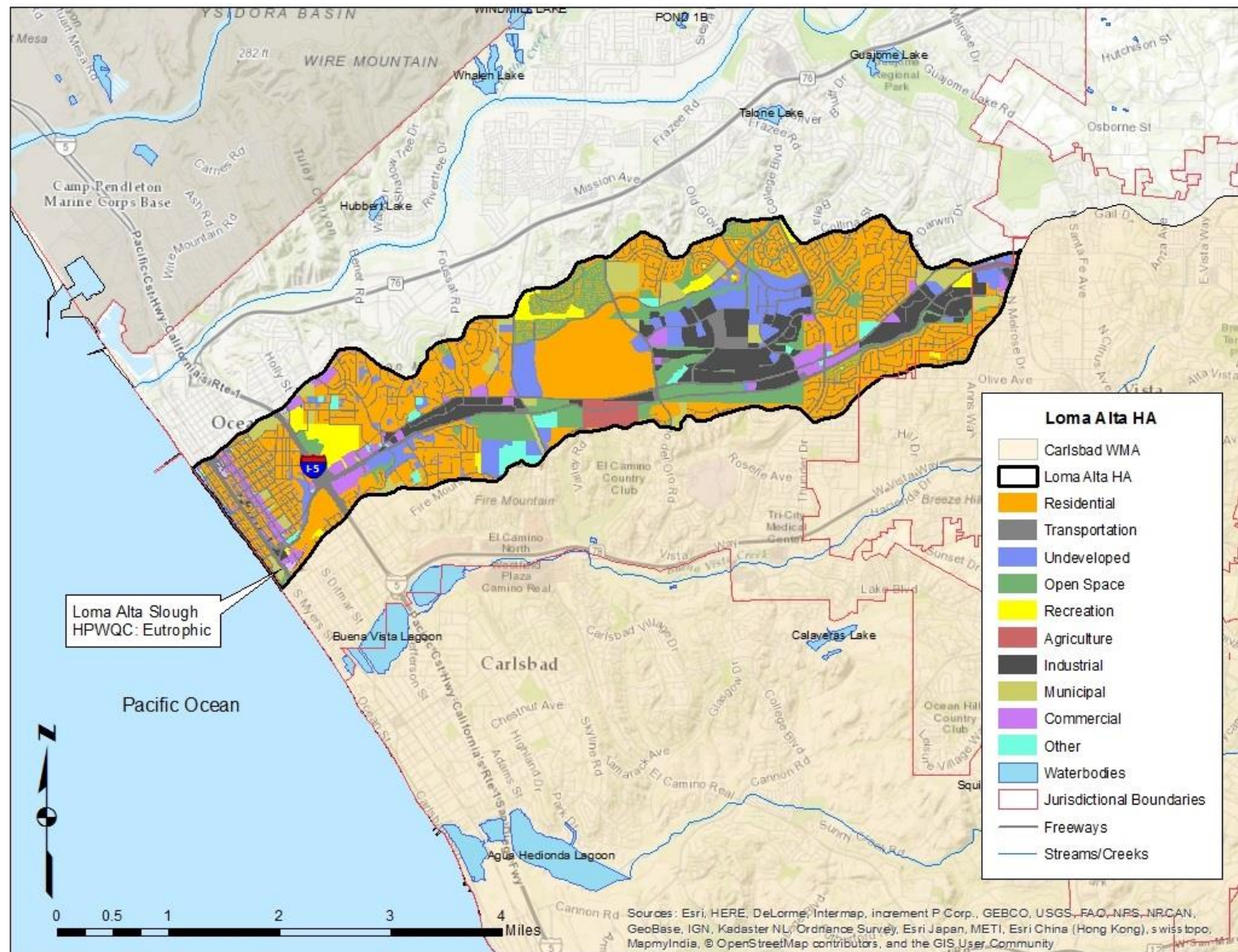


Figure 16: Loma Alta Hydrologic Area Land Uses

**Table 23: Pollutant Generating Sources – 904.1 Loma Alta Hydrologic Area**

Inventory Sites/Facilities <sup>1</sup>	Quantities <sup>2</sup>	Pollutant Source Loading Potential <sup>3</sup>									
		Metals	Oil & Grease	Sediment	Pesticides	Nutrients, HPWQC	Bacteria/Pathogens, PWQC	Dissolved Minerals	Organics	Trash, PWQC	Toxicity, PWQC
Animal Facilities	10	N	UL	L	UK	L	L	N	L	L	UK
Auto Repair, Fueling, or Cleaning	92	L	L	UL	UL	UK	UL	L	L	L	UK
Auto Parking Lots or Storage	6	L	L	L	UK	UK	UK	UL	L	UK	UK
Auto Body Repair or Painting	28	L	L	UL	UL	UL	UL	L	L	L	UK
Nurseries/Greenhouses	4	L	UL	L	L	L	L	UL	UL	UK	UK
Building Materials Retail	2	L	L	L	UL	UL	UL	UL	L	UK	UK
Chemical and Allied Products	4	UK	UK	UK	UK	UK	UL	N	L	UK	UK
Concrete Manufacturing	6	L	L	L	UL	UL	UL	UL	L	UK	UK
Eating or Drinking Establishments	123	N	L	UL	UK	UK	L	UL	L	L	UK
Equipment Repair or Fueling	14	L	L	UL	UL	UK	UL	UL	L	L	UK
Fabricated Metal	17	L	L	UK	UK	UK	UL	UL	L	UK	UK
Food Manufacturing	8	UL	UL	UL	UL	UL	UL	UL	UL	UK	UK
General Contractors	54	UL	UL	L	UL	UL	UL	UL	UL	L	UK
General Industrial	62	L	L	UK	UK	UK	UK	UK	L	L	UK
General Retail	125	UL	UL	L	UL	UL	UL	UL	UL	UK	UK
Institutional	6	L	UK	UK	UK	UK	UL	UK	UK	UK	UK
Motor Freight	12	L	L	UK	UK	UK	UK	UL	L	UK	UK
Offices	70	UK	UK	UK	UK	UK	UK	UK	UK	L	UK
Parks and Rec (incl. Golf, Cemetery)	1	UK	UK	UK	UK	L	UK	UL	UK	L	UK
Pest Control Services	6	N	UK	N	L	N	UK	N	UK	UK	UK
Pool and Fountain Cleaning	2	N	N	N	N	UK	N	N	UK	UK	UK
Primary Metal	8	L	UK	UK	UK	UK	UL	N	UK	UK	UK
Stone/Glass Manufacturing	8	L	L	L	UL	UL	UL	UL	L	UK	UK
Storage/Warehousing	14	L	L	L	UL	UL	UL	UL	L	UK	UK
Municipal	34	N	N	L	N	N	UK	UL	N	L	UK
Construction	Varies <sup>4</sup>	UL	UL	L	UL	UL	UL	L	UL	L	UK
Residential	2,025 acres	L	L	L	L	L	L	L	L	L	UK

The highest threat-to-water-quality (TTWQ) rated sources within each HA based on the HPWQC are identified in the table (yellow highlight signifies HPWQC). The HPWQC is associated with the sources that are likely to generate those pollutants (blue highlight). The PWQC is highlighted in green and the associated sources that are likely to generate those pollutants are depicted with an “L”.

1: Other sources are not reported in this table including: Land Development and Non-Inventoried Businesses

2: Quantities based on the RAs FY 2012 JURMP Annual Reports

3: Pollutant Source Loading Potential taken from LTEA 2011; N = None, UK = Unknown, UL = Unlikely, L = Likely

4: The quantity of construction sites is dynamic due to projects starting and completing at any given time.

NOTE: The 2011 LTEA did not include degradation of riparian habitat. However, all sources and pollutants included in the table can impact riparian habitat degradation.

### 3.1.3 Loma Alta HA Goals and Schedules

Identifying goals and the means to achieve them is a fundamental component of the Carlsbad WMA WQIP. Goals define realistic water quality improvement outcomes and provide direction and purpose to program planning. Interim and final numeric goals were identified as benchmarks for program performance and assessing progress through a measureable and quantifiable mechanism. The interim and final goals for the Loma Alta HA along with schedule are described below.

**Table 24: Loma Alta HA Interim and Final Numeric Goals and Schedule**

Hydrologic Area : Loma Alta		
High Priority Water Quality Condition: Eutrophic		Applicable Receiving Water(s): Loma Alta Slough
Pollutant/Stressor: Nutrients		Responsible Agencies: City of Oceanside
Interim Goal (2013-2018) 2018 <sup>1</sup>	Interim Goal (2021)	Final Goal (2023) <sup>2</sup>
Loma Alta Slough Conditions Between May – October: 1) Macroalgal Biomass less than 530g dry wt./m <sup>3</sup> 2) Macroalgal cover less than 75%	Loma Alta Slough Conditions Between May – October: 1) Macroalgal Biomass less than 350g dry wt./m <sup>3</sup> 2) Macroalgal cover less than 65%	Loma Alta Slough Conditions Between May – October: 1) Macroalgal Biomass less than 90g dry wt./m <sup>3</sup> 2) Macroalgal cover less than 50%

<sup>1</sup> Interim Macroalgal biomass and percent cover reduction goals are currently based on best professional judgment and historical data in Loma Alta Slough, as a current baseline of macroalgae data is not available. The goals may be adapted as monitoring data/information is gathered, analyzed and baselines are established.

<sup>2</sup> The Final Numeric Goals reflect those described in the draft TMDL report and reiterated in RWQCB Resolution No. R9-2014-0020.

The above Loma Alta HA Goals were identified based on macroalgae indicators of the eutrophic condition in Loma Alta Slough during the May-October impairment period. During the WQIP planning process and development of Resolution No. R9-2014-0020, the City of Oceanside agreed to use the final numeric targets from the draft TMDL as the WQIP Final Numeric Goals for the Loma Alta HA. Attainment of the Final Numeric Goals indicates that the eutrophic impairment during the May – October period has been addressed, and that related beneficial uses of Loma Alta Slough have been restored.



As current reliable baseline of macroalgal cover and biomass data in Loma Alta Slough are lacking, the Interim Numeric Goals listed in Table 24 were developed using best professional judgment, the Macroalgal Conditional Classification (Table 5 of the Draft TMDL<sup>10</sup>), and historical water quality monitoring data. The historical data used in formulating the Interim Numeric Goals included macroalgal biomass and percent cover data collected from Loma Alta Slough in the summer of 2008 as part of the draft TMDL planning process and an Investigative Order<sup>11</sup>.

The means for achieving these goals are identified in the strategies discussion below. Mechanisms for measuring progress towards and ultimately achieving these goals are discussed in the monitoring and assessment sections.

#### 3.1.4 Loma Alta HA Strategies

Based on the process and information identified in Section 2.4, the RAs within the Loma Alta HA identified the strategies to be implemented, or triggered for implementation, to address the HPWQC and PWQCs to the maximum extent practicable (MEP). In addition to the focus placed on the HPWQC, the RAs' strategies will be implemented within the respective RA's jurisdiction to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, and protect the beneficial uses of the receiving waters from MS4 discharges in order to achieve or maintain the interim and final numeric goals. Furthermore, in some cases, strategies include those that improve or enhance the natural beneficial watershed features: wetlands; riparian habitat; upland vegetation; and connectivity.

Table 25 identifies the Water Quality Improvement Strategies to be implemented throughout the entire Loma Alta HA. The Loma Alta HA HPWQC is highlighted in yellow and the PWQCs are highlighted in green in the table, and the strategies that are targeting those conditions are also identified. The table includes planned strategies to be implemented as part of the Copermittees' core programs and additional, "optional" strategies that RAs will implement to target the HPWQC or PWQCs.<sup>12</sup> RAs have in many cases enhanced their jurisdictional strategies to target specific areas or sources that are causing or contributing to the HPWQC or PWQCs in the Loma Alta HA. HA-specific geographic characterizations and prioritization is described in Section 3.1.5.1 and are noted in Table 25, where applicable. Additional optional strategies are also identified in Table 25. The additional optional strategies may be implemented based on a variety of triggers, such as progress made towards numeric goals. Strategies numbered 1-13 in Table 25 are described in Section 2.4 and further detailed in each RAs JRMP. All other strategies are described in the subsections below.

As the RAs implement strategies and analyze data, it is expected that these strategies and schedules may change through an iterative and adaptive management process. The adaptive management process is presented in Section 2.5.

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<sup>10</sup> California Regional Water Quality Control Board San Diego Region – Phosphorus Total Daily Maximum Daily Load for Loma Alta Slough, Oceanside California – Draft May 2014 Staff Report

<sup>11</sup> California Regional Water Quality Control Board San Diego Region, Investigation Order No. R9-2006-076, Owners and Operators of Municipal Separate Storm Sewer Systems, California Department of Transportation, Hale Avenue Resource Recovery Facility, and North County Transit District Responsible for the Discharge of Bacteria, Nutrients, Sediment, and Total Dissolved Solids into Impaired Lagoons, Adjacent Beaches, and Agua Hedionda Creek. July 2006.

<sup>12</sup> Core programs address the requirements of Permit Provisions E.2 through E.7, and their inclusion in the Water Quality Improvement Plan is discussed in Permit Section B.3.b.(1)(a). The requirements applicable to additional, "optional" strategies are discussed in Permit Provision B.3.b.(1)(b).



Table 25: Loma Alta HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area			Target Sources								Target Pollutant, Stressor, or Condition								Target Temporal Benefit		Implementation Schedule									
		City of Oceanside	City of Vista	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b)))																																
1	Administrative BMPs	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
2	Investigations	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
3	Development and Redevelopment Requirements	HA Wide	HA Wide	HA Wide						•			•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
4	Construction Site Inspections	HA Wide	HA Wide	HA Wide				•					•	•		•	•			•		•	•	•	•	•	•	•	•	•	•	
5	Existing Development Facilities, Areas and Activities Inspections	HA Wide	HA Wide	HA Wide	•	•		•			•		•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
6	MS4 Inspections/Cleaning	HA Wide	HA Wide	HA Wide								•	•	•		•	•			•		•	•	•	•	•	•	•	•	•	•	
7	Street Sweeping	HA Wide	HA Wide	HA Wide							•		•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	
8	General Education and Outreach	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•			•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
9	Employee Training <sup>2</sup> /Focused Training	HA Wide	HA Wide	HA Wide	•						•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
10	Enforcement	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
11	Partnership Program(s)	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
12	Program for Retrofitting Areas of Existing Development	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
13	Program for Stream, Channel and/or Habitat Restoration in Areas of Existing Development	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
14	Community Based Social Marketing – Private Landscapers	Oceanside Jurisdiction within Loma Alta HA	-	-				•	•				•	•	•	•	•	•	•	•	•		•			•	•	•	•	•		
15	Incentive and rebate programs for landscape and landscape irrigation retrofits.	Oceanside Jurisdiction within Loma Alta HA	-	-				•	•	•			•	•	•	•	•	•	•	•	•		•			•	•	•	•	•		
16	Irrigation system evaluations for irrigated crop lands	Oceanside Jurisdiction within Loma Alta HA	-	-				•	•				•	•	•	•	•	•	•	•	•		•			•	•	•	•	•		
17	Closed Circuit Television of Vitrified Clay Pipe Sewer Lines	Oceanside Jurisdiction within Loma Alta HA	-	-								•	•	•		•	•			•		•	•	•	•	•	•	•	•	•	•	
18	Fats, Oil and Grease (FOG) Targeted outreach to targeted residential areas and restaurants	Oceanside Jurisdiction within Loma Alta HA	-	-		•							•	•		•	•	•				•	•	•	•	•	•	•	•	•	•	
19	Recreation Vehicle (RV) sewage disposal and Modular Wetland	Oceanside Jurisdiction within Loma Alta HA	-	-					•				•	•		•	•					•	•	•	•	•	•	•	•	•	•	

Table 25: Loma Alta HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area			Target Sources								Target Pollutant, Stressor, or Condition								Target Temporal Benefit		Implementation Schedule								
		City of Oceanside	City of Vista	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)
20	Existing Industrial and Commercial Inspections – Trash Enclosures	Oceanside Jurisdiction within Loma Alta HA	-	-		•					•		•	•		•	•	•	•	•	•	•									
21	Ultraviolet Bacteria Treatment Facility	Oceanside Jurisdiction within Loma Alta HA	-	-	•			•	•		•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
22	Runoff and Nutrients Source Reduction	Collins Basin, Temple Heights, Oceanside and Vista Residential Focus Area	Oceanside and Vista Residential Focus Area	-		•		•					•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
ADDITIONAL OPTIONAL STRATEGIES (PERMIT SECTION B.3.b. (1) (b)) (more information on these strategies and criteria for initiating them can be found in Section 3.1.5.2.2)																															
23	Develop List of Potential Structural or Retrofit Existing BMPs to Address Flow/Pollutant Issues	Collins Basin	Oceanside and Vista Residential Focus area	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.1.5.2.2 for information)							
24	Enhanced Treatment Control BMP Inspection Program	Collins Basins	-	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.1.5.2.2 for information)							
WATERSHED MANAGEMENT AREA STRATEGIES (PERMIT SECTION B.3.b. (2))																															
25	Integrated Regional Watershed Management(IRWM)	WMA wide	WMA wide	WMA wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating							
26	Sustainable Landscape Incentive Program	WMA wide	WMA wide	WMA wide	•	•		•					•	•		•	•		•	•	•	•		Based on appropriate criteria for initiating							

1 Optional Strategies. Note that where optional strategies are listed under the Planned Jurisdictional Strategies category, RAs have committed to implementing them, so no additional detail on circumstances that would trigger those optional strategies is necessary.

### 3.1.4.1 Geographic Characteristics and Prioritization

Focusing program efforts in specific geographic areas to address known or suspected sources of discharges and pollutants are expected to improve the effectiveness of the strategies and activities.

Based on the RAs review of the characteristics of the Loma Alta HA, several areas of focus were identified for concentrated program efforts. Focus areas were selected based on identified sources that are associated with contributing to the HPWQC and PWQCs, outfall data collected by RAs, and other identified characteristics that support the areas as priority areas. The focus areas in the Loma Alta HA include the entire Oceanside jurisdiction within the HA, the Collins Basin Drainage Area, the Temple Heights Business Park Drainage Area, and an Oceanside/Vista Residential Area.

#### 3.1.4.1.1 City of Oceanside Jurisdiction Area

The City of Oceanside covers approximately 97 percent of the entire Loma Alta HA. The City of Oceanside will implement its program core strategies throughout its jurisdictional boundaries of the Loma Alta HA (Figure 17). In addition to the core jurisdictional strategies, the City of Oceanside will supplement or modify core strategies planned for implementation in the Loma Alta HA to target sources of pollutants and discharges. The strategies listed in Table 25 will be initiated upon approval of this WQIP, and are expected to meet the final numeric goal within the proposed schedule.

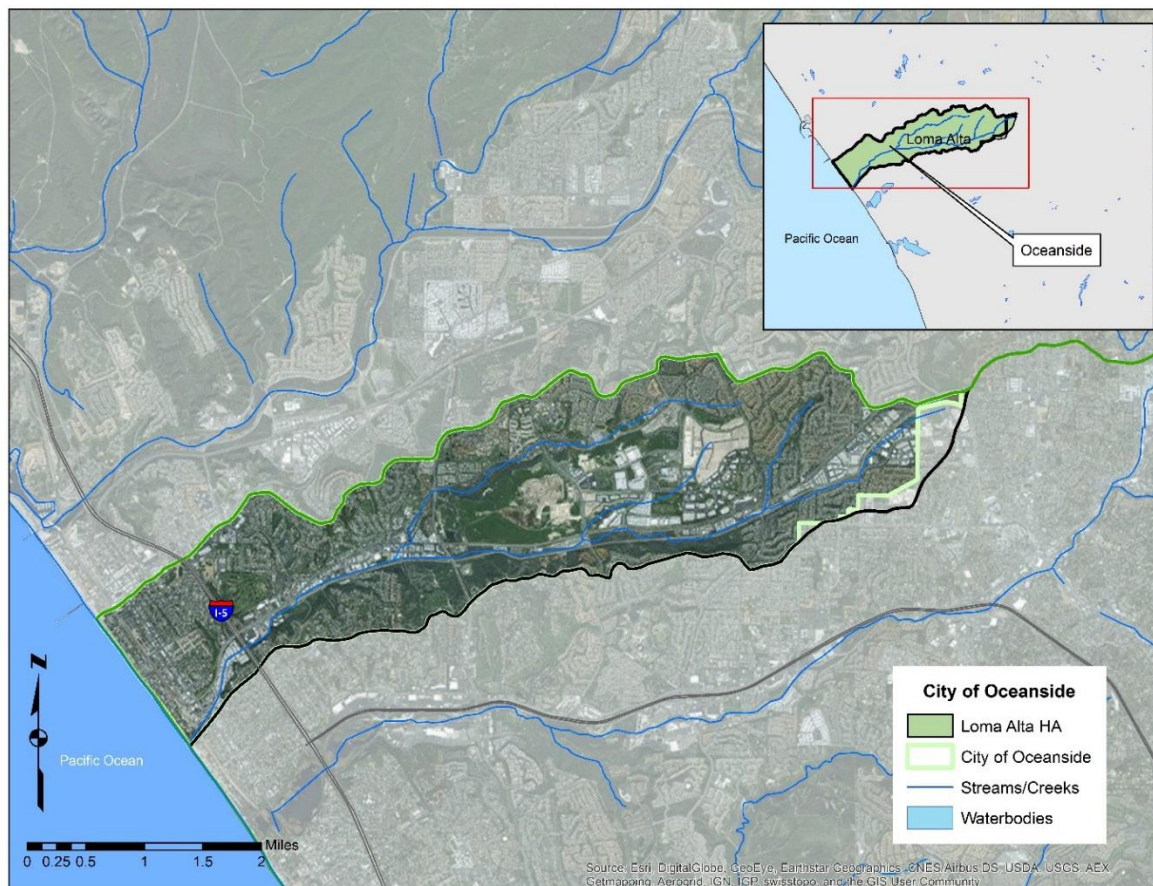


Figure 17: Oceanside Jurisdiction within Loma Alta HA

The identified strategies are expected to have multi-pollutant benefits and intended to address non-storm water flows and reduce the source loading of nutrients and other pollutants, related to the priority water quality conditions. Reducing non-storm water flows: (1) reduces the loading of pollutants discharged to



and from the MS4 system; (2) reduces the amount of indicator bacteria regrowth and contributions that occurs with accumulated biofilm in MS4 systems that requires water; and (3) reduces the wet-weather contribution of indicator bacteria from scoured biofilm under higher velocity flows from storm discharges.

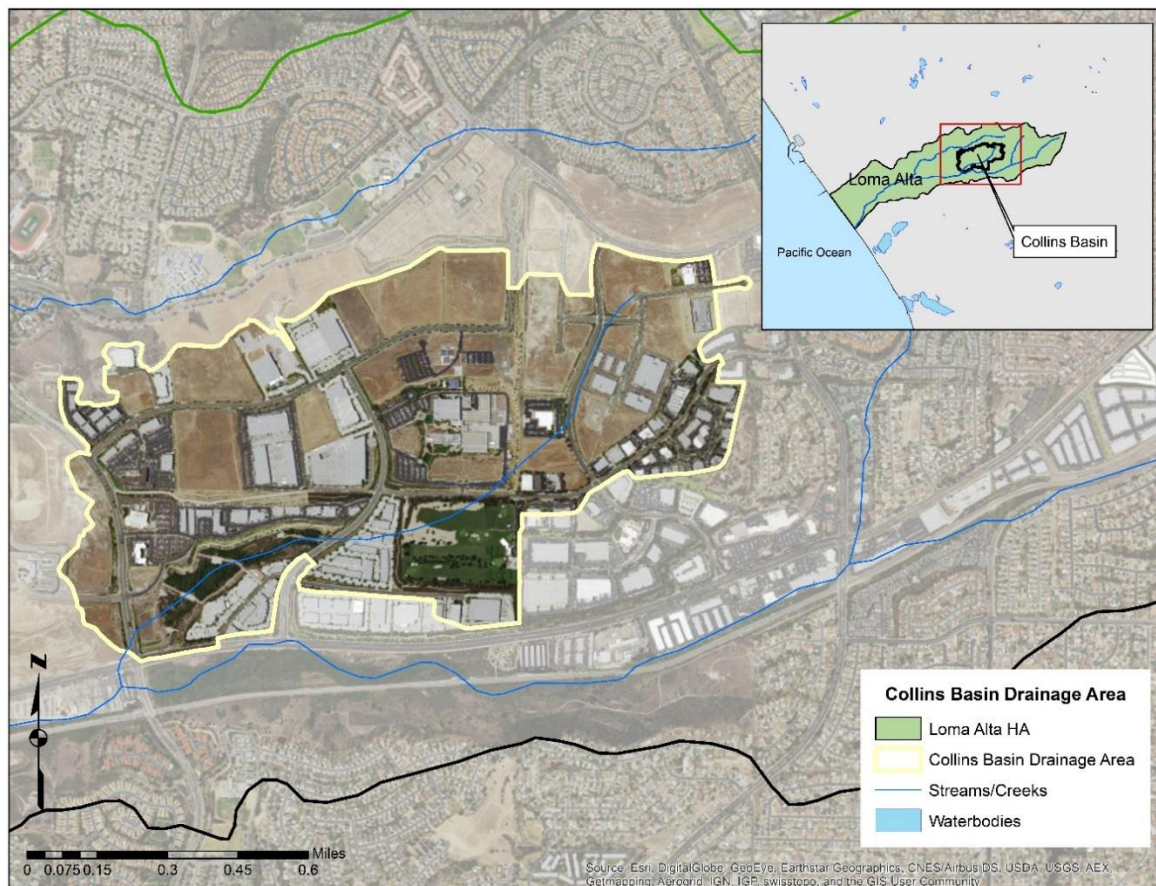
Within the Oceanside jurisdictional boundaries, there are many areas where landscapers/gardeners provide landscape services, including fertilizer and pesticide applications, trimming and planting. Addressing this target audience on an HA basis will concentrate resources towards addressing practices associated with nutrients that may be contributing to eutrophic conditions at the Loma Alta Slough.

#### 3.1.4.1.2 Collins Basin and Temple Heights Drainage Areas

The City of Oceanside has identified two drainage basins as focus areas with similar planned strategies: Collins Basin Drainage Area and Temple Heights Drainage Area. Both are described in more detail below.

##### *Collins Basin Drainage Area*

The Collins Basin Drainage Area is located mid-watershed and conveys discharges from surrounding commercial and light industrial properties to a series of detention basins, prior to discharging to Loma Alta Creek. The Collins Basin drainage includes commercial and industrial land uses, streets, buildings, parking lots and landscaped areas, which are known types of contributors to non-storm water discharge resulting in nutrient loading – see Figure 18.



**Figure 18: Collins Basin Drainage Area/Focus Area**

### Temple Heights Drainage Area

The Temple Heights Drainage Area is a commercial and industrial area located at the headwaters of the watershed that discharge to two MS4 outfalls prior to discharging to Loma Alta Creek. Temple Heights is comprised primarily of office buildings and light industrial land uses, and includes streets, buildings, parking lots and landscaped areas, which are known types of contributors to non-storm water discharge, resulting in nutrient loading. See Figure 19 for the drainage/focus area.

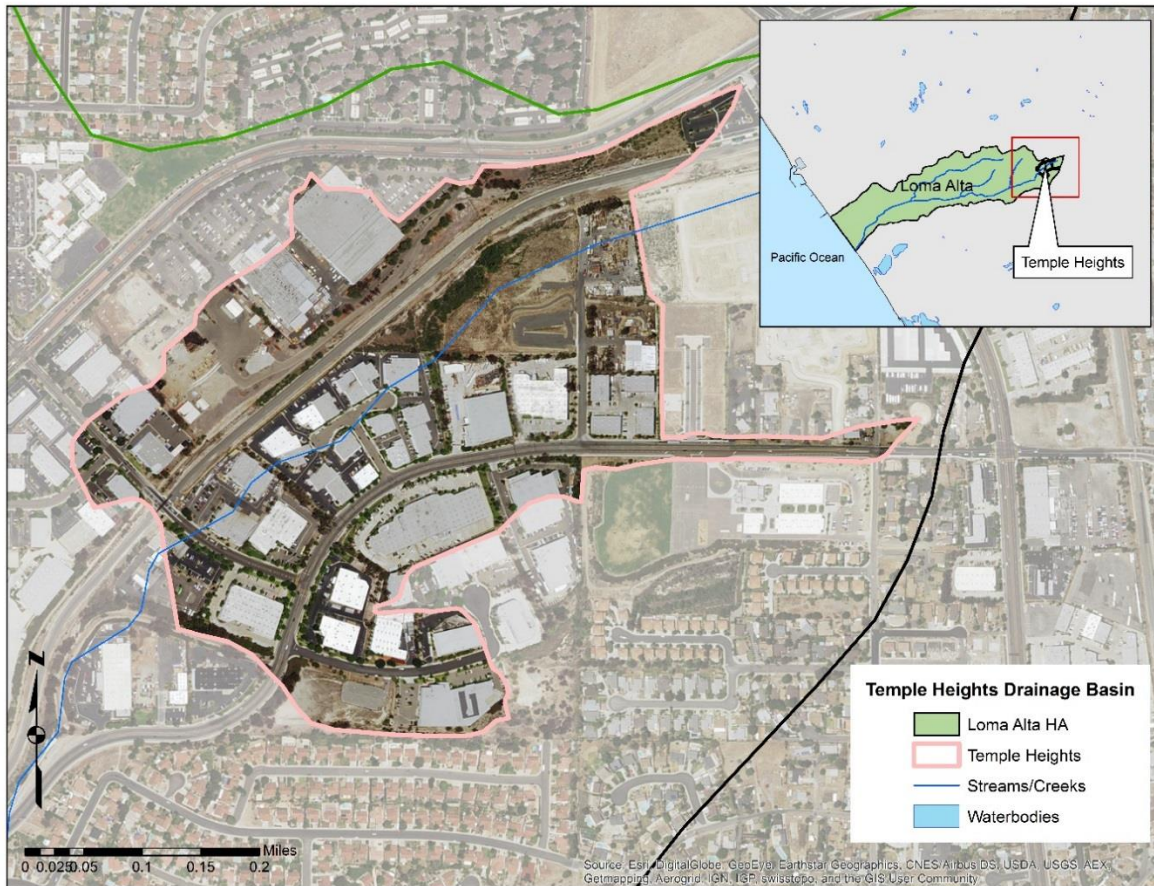


Figure 19: Temple Heights Drainage Area/Focus Area



### 3.1.4.1.3 Oceanside/Vista Residential Area

The Oceanside/Vista Residential focus area is located near the headwaters of the watershed that discharge to an MS4 outfall prior to discharging to Loma Alta Creek. This residential area is comprised primarily of single family residential land uses, and includes some common open space and recreational park areas that include landscaping and turf, which are land uses that typically exhibit non-storm water discharges and nutrient loading – see Figure 20 for the focus area.

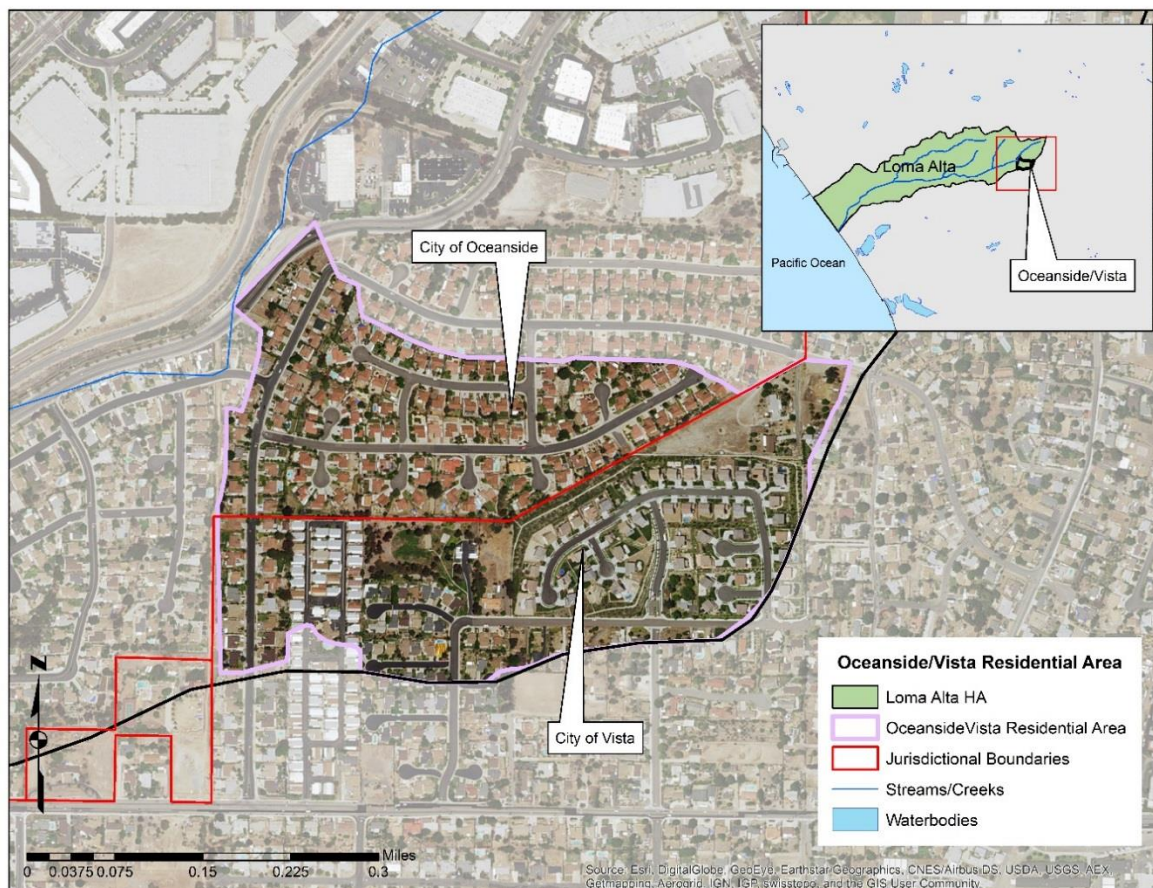


Figure 20: Oceanside/Vista Residential Focus Area

### 3.1.4.2 Loma Alta HA Strategy Descriptions

The following sections describe the planned jurisdictional and planned optional strategies, additional optional strategies, and watershed management area strategies to be implemented within the Loma Alta HA.

#### 3.1.4.2.1 Planned Jurisdictional and Optional Strategies

The planned jurisdictional and planned optional strategies to be implemented within the Loma Alta HA are described below. These strategies include the core jurisdictional program elements (Permit Provisions, E.2. through E.7.)<sup>13</sup> as described in Section 2.4.2 of this WQIP, enhancements of the core jurisdictional program elements, and optional strategies that are planned for implementation. Optional strategies that are already planned for implementation do not include additional detail on circumstances that would trigger implementation or funding and resources.

<sup>13</sup> Core jurisdictional program elements (Strategies 1-13 in Table 4) are described in Section 2.4.2 of this WQIP and are not summarized in this section.



### Strategy 14 (Table 25) - Community Based Social Marketing – Private Landscapers

**Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients;</b> <i>Bacteria/Pathogens;</i> <i>Toxicity;</i> Trash; Heavy Metals; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

##### *Observation Research*

This project would begin with observational research to identify target behaviors of landscape workers which may be linked to polluted non-storm water discharges and runoff from a selected MS4 draining a residential neighborhood in the Loma Alta watershed. The targeted neighborhood would be selected based on long-term water quality and observational monitoring where a persistently flowing outfall has been identified. The observations would focus on identifying concrete behaviors by observing what is happening in the target community. Examples of these behaviors could be fertilizer and pesticide application practices and how green waste is gathered and disposed. Thirty observation visits are proposed which will provide minimum statistical validity and adequately represent all times of the day (AM/mid-day/PM) and weekdays/weekends. Enforcement actions will be implemented if an activity is an immediate threat to water quality and human health. If it is determined that the behaviors are not contributing to anthropogenic persistent flows, sources of the flows will be further researched to determine if the flows are a groundwater source or other permitted discharge allowed within that outfall drainage area.

Improvements in MS4 discharge water quality and/or reductions in pollutant loading at the outfall will be quantified using a combination of flow measurements and grab sample collections. Baseline measurements will be taken prior to implementing any outreach programs within the upstream drainage area. A qualified laboratory will analyze samples for constituents related to impairments in the receiving water. Measurements collected during and after the outreach implementation period will be used to assess the relative effectiveness of the program on reducing pollutant loadings and/or non-storm water flows from the identified MS4 outfall. Both the baseline and post-implementation periods will require an adequate number of sampling points to ensure statistical significance in establishing whether the program implementation correlates with changes in discharge water quality.

##### *Focus groups with landscape gardeners*

Focus groups offer an additional opportunity to survey the target audience face-to-face and identify the barriers that impede those individuals from engaging in behaviors that protect water quality. This approach enhances the likelihood of developing programs that maximize behavior change amongst the target audience. This task would involve recruiting five landscape gardeners to conduct a 30-minute interview. To encourage participation in the focus groups, an incentive will be offered to the target audience such as a specific dollar amount to participate in the interview and/or a light lunch.

Landscape gardeners would be recruited in collaboration with the local compost facility Agricultural Service. This facility accepts green waste from landscape gardeners in the City of Oceanside as well as other commercial landscape operators. When gardeners deliver their materials to the compost facility, they would be handed a recruitment piece requesting their participation in the focus group. All materials would be provided in Spanish and a Spanish speaker would conduct the interviews.

##### *Implementation*

Based on the results from the observation research and the focus group component, behavior change tools will be identified based on their fit with the identified barriers and benefits. This information will drive the development of the overall outreach campaign for pilot testing.

Once the appropriate methodologies for pilot testing the developed strategies are designed, the target audience will be provided with detailed protocols and instructions for pilot implementation. This information will be distributed by Agricultural-Service staff to its target audience, during normal operating hours.

**Continued from previous page**

Based on the successful strategies identified during pilot testing a series of strategies or toolkits will be applied more broadly to groups that share similar barrier and benefit profiles for the target behavior. Improvements in MS4 discharge water quality and/or reductions in pollutant loading at the outfall will be quantified using a combination of flow measurements and grab sample collections as described above.

It will also be determined if the target audience can be a conduit to providing homeowners with water efficient landscape incentive and rebate programs being offered by Metropolitan Water District (MWD) and the San Diego County Water Authority.

**Strategy 15 (Table 25) - Incentive and Rebate Programs for Landscape and Landscape Irrigation Retrofits**

**Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> Residential; General Public; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients;</b> <i>Bacteria/Pathogens; Toxicity;</i> Trash; Heavy Metals; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of Oceanside actively participates and promotes rebate and incentive programs for landscape vegetation conversions and irrigation system retrofits. Households and businesses that take advantage of these incentive and rebate programs, directly benefit water quality because of the goal to prevent water waste which includes prevention of irrigation runoff. Example incentive and rebate programs may include irrigation nozzles, irrigation controllers, rain barrels, soil moisture sensors, and turf replacement with either artificial turf or California friendly plants. These programs are implemented in conjunction with the San Diego County Water Authority and the Metropolitan Water District of Southern California and when funding is available. The City of Oceanside also promotes these programs through the implementation of workshops that assist homeowners and businesses in identifying the best product for their needs, how to install and replace the specific items, and how to apply for the incentive and funding rebates.

**Strategy 16 (Table 25) - Irrigation System Evaluations for Irrigated Crop Lands**

**Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> Residential; General Public;	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients;</b> <i>Bacteria/Pathogens; Toxicity;</i> Trash; Heavy Metals; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of Oceanside Water Utilities Department contracts with Mission Resource Conservation District to conduct Irrigation System Evaluations for properties with one or more irrigated acres of crop land within the City of Oceanside. The primary purpose of the irrigation evaluation is to assess the performance of the system while it is in operation. The property owner and/or irrigation system operator will be provided with a report that includes: data on the system's flow rate and performance which reflect how evenly water is spread over the planting; observations and recommendations to improve system performance; information about the soils on the property and their water holding capacity; information on crop water use patterns; and best management practices for fertilization, erosion control and pesticide use. These evaluations are important to assist agricultural growers in preventing irrigation runoff which can be a carrier of fertilizers, pesticides, sediment and bacteria to local surface waters.

### Strategy 17 (Table 25) - Closed Circuit Television of Vitrified Clay Pipe Sewer Lines

**Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

The City of Oceanside finalized a contract with a consultant in FY 14-15 to perform both cleaning of all Vitrified Clay Pipe (VCP) sewer lines and to perform a high definition 360 scan of the 263 miles of VCP lines. Work is scheduled to commence in fiscal year 2015-16 and will continue over a two-year period. This will allow the Sewer Department to identify possible exfiltration and infiltration problems and other sewer line infrastructure problems. The sewer department will be better able to develop management measures and associated budgets and schedules to repair and address these issues in the future.

### Strategy 18 (Table 25) - Fats, Oil and Grease (FOG) Targeted Outreach to Targeted Residential Areas and Restaurants

**Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> Industrial and Commercial Facilities/Owners	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients; <i>Bacteria/Pathogens</i>; Oil and Grease</b>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

In order to reduce bacteria loading to the San Luis Rey River, reduction and elimination of sanitary sewer overflows (SSOs) will assist in meeting the overall numeric goals for the watershed. The City of Oceanside continues to track where SSOs have occurred and where sewer line maintenance has identified a build-up of grease in the sewer line. Based on this information, residential areas and restaurants will be identified for focused outreach regarding proper disposal of fats, oils, and grease, and enforcement of grease interceptor maintenance per the City Ordinance. Clean Water Program staff will collaborate with the City sewer division to determine if there is a reduction of SSOs and grease build-up in these targeted areas.

### Strategy 19 (Table 25) - Recreation Vehicle (RV) Sewage Disposal and Modular Wetland

**Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> General Public	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

The City of Oceanside manages the Harbor Beach Campground, which is basically a parking lot in the Oceanside Harbor area that allows for overnight and extended stays for recreation vehicles. There are no hookups available for sewage disposable at each of the designated sites. Nearby the RV campground is a sewage disposal station with two wastewater discharge hook-ups for recreational vehicles (RVs). Providing this opportunity for proper sewage disposal from RVs prevents RV owners and operators from illegally disposing of wastewater. Since this discharge location is within the harbor area adjacent to high use recreational waters, the City of Oceanside has installed and maintains a modular wetland system to treat and remove bacteria from wastewater that may not be directed into the sewage disposal hookup due to drips and accidental spills. To address bacteria, the Modular Wetland is utilizing a proprietary filter media in lightweight block format that is easy to handle and replace, for primary filtration. The wetland is then using a sub-surface flow wetland for biological remediation. Because the harbor is a harsh, salt-water environment, the system is using a hardy, fast growing plant with large root bundles.

**Strategy 20 (Table 25) - Existing Industrial and Commercial Inspections-Trash Enclosures****Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> Industrial and Commercial Facilities; General Public; Streets and Parking Facilities;	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients; <i>Bacteria/Pathogens</i>; Trash;</b> Heavy Metals; Oil and Grease; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Trash enclosures have been determined to be a likely source of bacteria during both dry weather and wet weather conditions. Rainwater can travel through the enclosure carrying bacteria, food waste and trash to the storm drain system and possibly local surface waters. During inspections of existing industrial and commercial facilities, the trash enclosure and waste disposal areas are inspected for any possible illegal discharges and to determine proper management of waste. Enclosures that accept waste from drinking and eating establishments are highly scrutinized due to the type of waste that can be generated from them, including cooking grease storage, food waste and food packaging.

**Strategy 21 (Table 25) - Ultraviolet Bacteria Treatment Facility****Jurisdiction/Area for Implementation:** Oceanside Jurisdiction within Loma Alta HA

<b>Target Sources:</b> Municipal Fixed Facilities; Residential; General Public; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens</i>	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of Oceanside will continue to operate the ultraviolet (UV) treatment system just upstream of Buccaneer Beach between May and September each year. The system actively eliminates 99% of the indicator bacteria passing through the system.

The treatment facility consists of piping flows from an existing diversion structure by gravity from the lagoon through a 2-micron fine screen to a wet well where the flow is pumped into two large sand filters, followed by two UV disinfection units housed in a reinforced concrete building. The treated water is discharged through a pipe extended along the existing section of rip-rap that runs along the north side of the Loma Alta Creek outlet at Buccaneer Beach. During wet weather months (November through April), with increased flow in the creek, the lagoon is periodically open to the ocean and the UV system is bypassed.

**Strategy 22 (Table 25) - Runoff and Nutrients Source Reduction****Jurisdiction/Area for Implementation:** City of Oceanside: Collins Basin, Temple Heights, Oceanside/ Vista Residential;  
City of Vista: Oceanside and Vista Residential Focus area

<b>Target Sources:</b> Industrial and Commercial Facilities/owners; Residential	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients; <i>Bacteria/Pathogens</i>; Pesticides</b>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:***Preliminary Assessment*

During FYs 2015 and 2016, the Cities will:

- Conduct observations to confirm the flows from this focus area are persistent and from anthropogenic sources – FY 2015 and FY 2016;
- Identify, through observations, the common categories of non-storm water discharges to the MS4 in the first year of assessment – FY 2015;
- Identify, through observations, repeat non-storm water violators within the focus area – FY 2015; and
- Categorize and prioritize the discharges to inform the education programs and/or enforcement mechanisms to focus on the specific problems or issues.

**Continued from previous page**

**Source Reductions**

Based on findings from the preliminary assessment, the Cities will make determinations of the most appropriate strategies to implement in subsequent years. The following strategies may be implemented to address identified issues:

- Irrigation runoff reduction strategies
- Water conservation rebates, free home irrigation conversion consultations
- Smart gardening practices, compost use, proper fertilizer applications
- Shared drainage outreach to identify measurable improvements
  - Focus on residential properties
  - Continue baseline monitoring at shared drainage area outfalls
  - Regular dry-season monitoring aligned with outreach strategies
- Implement educational activities within the upstream residential drainage to prevent illegal discharges to the MS4 based on non-storm water discharge findings
  - Potential outreach tasks and materials could include mailing lists, door-to-door handouts, collaboration with HOA board of directors or property management companies
  - Community meetings with Cities' staff, presentations at regular HOA briefings
  - Offer irrigation incentive programs for homeowners within the focus area - Leverage existing rebates through SDCWA, MWD, and VID
- Conduct at least monthly inspections of the drainage area for other illegal discharges

**3.1.4.2.2 Loma Alta HA Additional Optional Strategies**

This section describes the additional optional strategies that will be triggered for implementation in response to specific conditions that are described in accordance with the requirements of Permit Provision B.3.b(1)(b).

**Strategy 23 (Table 25) - Develop List of Potential Structural or Retrofit Existing BMPs to Address Flow/Pollutant Issues**

**Jurisdiction/Area for Implementation:** City of Oceanside: Collins Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients;</b> <i>Bacteria/Pathogens; Toxicity;</i> Trash; Heavy Metals; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Implement structural (engineered) BMPs or retrofitting existing structural BMPs to address flow and/or pollutant issues. The Collins Property Flood Control Basins were built as part of a commercial and industrial development area, located in the Loma Alta Hydrologic Area. This series of flood control basins was designed to reduce peak discharge and volumetric runoff reduction during large rain events. The design consists of four individual basins that each have risers and concrete spillways to prevent flooding downstream in Loma Alta Creek. When built, these basins did not incorporate water quality improvement components except for the ability to infiltrate water in each basin from smaller storm water and non-storm water flows. The City of Oceanside has identified this drainage area as a focus area in the Carlsbad WMA due to observed dry weather persistent flows from outfalls that drain to the Basins. These basins have the potential to be modified to incorporate water quality components that address priority water quality conditions, if needed.

**Continued from previous page**

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the cities to implement.

**Resources Required to Implement Strategy:**

Voter/council approval of projects; staffing necessary to implement the planning, design and construction of such projects; project funding.

**Timeline to Secure Resources for Optional Strategy:**

If implemented, structural BMPs will be integrated into the City's Capital Improvement Program for planning, design and construction. Many of the City's typical capital projects are funded through dedicated sources, e.g., transportation tax dollars. Structural BMPs will have to identify alternative sources of funding, e.g., grants, and therefore may take longer to process than typical capital projects. It is estimated that structural BMP projects may take five years to secure the resources necessary to initiate each project within the strategy.

**Strategy 24 (Table 25) - Enhanced Treatment Control BMP Inspection Program**

**Jurisdiction/Area for Implementation:** City of Oceanside: Collins Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <b>Nutrients;</b> <i>Bacteria/Pathogens; Toxicity;</i> Trash; Heavy Metals; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The Collins Property Flood Control Basins (Collins Basins) were built as part of a commercial and industrial development area, located in the Loma Alta Hydrologic Area. All of the development projects in this drainage area are considered priority development projects and have incorporated treatment control best management practices. (TCBMPs). There are 15 priority development projects with 189 treatment control BMPs that drain to the Collins Basin. In the future, additional priority development projects are being built and planned that will drain to the Collins Basin.

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the cities to implement.

**Resources Required to Implement Strategy:**

Additional staff time would be needed to increase the inspection frequency of the TCBMPs in this drainage area. Also, as more development projects are built, more staff time would be needed to inspect additional TCBMPs. Implementation is dependent on the staff resources and funding available to increase the inspection frequency.

**Timeline to Secure Resources for Optional Strategy:**

It may take one to two years to acquire the funding and get approval from City Council to hire additional staff or contractors to increase the TCBMP inspection frequency.

**3.1.4.2.3 Watershed Management Area Strategies**

Watershed Management Area Strategies to be implemented within the Carlsbad WMA are described in Section 2.4.4.

**3.1.5 Loma Alta HA Monitoring and Assessment**

The City of Oceanside will conduct the following monitoring in the Loma Alta HA including the collective watershed-wide monitoring activities described in Section 2.6:

- Progress Toward Interim and Final Goals
  - Long-Term Water Quality Monitoring at Loma Alta Slough (Special Study by City of Oceanside)
- MS4 Outfall Monitoring (as described in Section 2.6)



- JRMP Implementation (as described in Section 2.6)
- Regulations and Policy (as described in Section 2.6)

***Progress toward Interim and Final Goals - Long-Term Water Quality Monitoring at Loma Alta Slough***

To assess progress toward achieving the interim and final numeric goals, the City of Oceanside, in cooperation with the Loma Alta HA RAs, will spearhead a long-term water quality monitoring program in Loma Alta Slough. This effort is consistent with RWQCB Resolution No. R9-2014-0020, and the monitoring plan is based on RWQCB Tentative Investigative Order No. R9-2014-0020 which the Resolution replaced.

The project involves development of a sampling and analysis plan and annual monitoring activities to assess the effectiveness of the City of Oceanside watershed management efforts in meeting the numeric goals. The plan will track the levels of macroalgae growth and nutrient loading into Loma Alta Slough during the May-October impairment period. The project is directly related to nutrients, the Highest Priority Water Quality Condition in the Loma Alta Creek HSA. The project:

- Will address data gaps related to variability in the extent and magnitude of the eutrophic condition as well as nutrient levels entering Loma Alta Slough.
- Is directly related to nutrients and the effects they have on the receiving water, which is the Highest Priority Water Quality Condition in the Loma Alta HA.
- Will help develop information necessary to more effectively address sources contributing to the Highest Priority Water Quality Condition.

The objectives of the study are as follows:

- Develop a water quality monitoring program for the Loma Alta Slough (Monitoring Plan) that will allow the City of Oceanside to track progress toward achieving the interim and final numeric goals. The plan will also be accompanied by a Quality Assurance Project Plan (QAPP). The County of San Diego and City of Vista will participate in an advisory role, reviewing the work plan, QAPP, and monitoring plan.
- Perform annual water quality monitoring activities per the Monitoring Plan and QAPP. This includes a watershed nutrient loading and macroalgae monitoring component. The monitoring will occur every summer from 2016 to 2022.
- Prepare annual monitoring reports summarizing the monitoring activities, data analyses, and assessments from each annual monitoring period.
- Perform an effectiveness assessment at the end of the Slough monitoring program, comparing both data from the City of Oceanside MS4 outfall monitoring and the receiving water component. Comparisons will help determine whether reductions in MS4 discharges or pollutant loading, as a result of the City of Oceanside watershed management strategies, has resulted in measurable improvements to the eutrophication impairment.

**Loma Alta Slough Monitoring Program Details**

The monitoring program is designed to address the following questions:

1. *Are watershed flows and the loading of phosphorous to the Slough reduced to levels required to meet the macroalgal numeric targets?*
2. *Are the numeric targets for macroalgal cover and biomass in the Slough achieved?*

To answer these questions, a Monitoring Plan and QAPP was developed by the City of Oceanside consistent with the requirements and schedule of Tentative Investigative Order No. R9-2014-0020, reiterated by Resolution No. R9-2014-0020. Water quality data will be collected during the impairment period and monitoring reports will be prepared annually to allow the City of Oceanside to evaluate the

effectiveness of their actions to reduce phosphorus loading to the Slough and achieve the numeric goals listed in Section 3.1.3.

#### Preparation of Monitoring Plan and QAPP

The City of Oceanside prepared a detailed Monitoring Plan and associated QAPP to describe in detail the study objectives, schedule, methods, analysis and reporting activities. The final Monitoring Plan and QAPP is posted on the Project Clean Water website ([www.projectcleanwater.org](http://www.projectcleanwater.org)).

#### Watershed Nutrient Loading

Two locations will be identified in Loma Alta Creek to perform weekly sampling during July and August of each year to measure ambient flows and MS4 discharges to Loma Alta Slough. The two locations will be positioned in areas upstream of the Slough, but downstream of known locations of groundwater influence to adequately capture all dry weather flows entering the Slough. Water flow instrumentation will be installed to continuously measure flow inputs into Loma Alta Slough, and water quality data (dissolved oxygen, conductivity, pH, temperature, turbidity) will also be continuously collected. Sampling of the creek inflows into the Slough will be conducted weekly at each of the two locations through July and August of each year, totaling eight weekly events per monitoring season. Samples will be flow-weighted composites collected over 24-hour periods, and will be analyzed for nutrients listed in Table 26.

**Table 26: Chemical Parameters and Analytical Methods for Watershed & Slough Monitoring**

Analysis	Method	Units
Ammonia	EPA 350.1	mg/L
Chlorophyll-a, Suspended	SM 10200	mg/L
Nitrate as N	EPA 300.0*	mg/L
Nitrite as N	EPA 300.0*	mg/L
Nitrogen, Dissolved	By Calculation	mg/L
Nitrogen, Total	By Calculation	mg/L
Orthophosphate	EPA 365.1	mg/L
Phosphorus, Dissolved	EPA 365.1	mg/L
Phosphorus, Total	EPA 365.1	mg/L
Total Kjeldahl Nitrogen	EPA 351.2	mg/L
Total Kjeldahl Nitrogen, Soluble	EPA 351.2	mg/L

#### Macroalgae and Dissolved Oxygen Monitoring in Loma Alta Slough

Macroalgae biomass and percent cover monitoring in Loma Alta Slough will be performed once each month during July and August of each year from 2016-2022. To ensure adequate spatial representativeness, macroalgae biomass will be collected over the entire Loma Alta Slough using a one-meter grid map with randomly identified sampling points. Sixteen stations across the Slough (eight upstream and eight downstream of the railway bridge) will be evaluated each month. Sample collection will involve methods to collect the entire biomass of the grid cell and measure the volume of water sampled to calculate dry weight macroalgal biomass in cubic meters (grams per m<sup>3</sup>). Additionally, ambient water quality samples will be collected at the same locations as dissolved oxygen monitoring stations and

will be analyzed for constituents listed in Table 26. Macroalgae percent cover will be measured using the point-intercept method within the grid utilized for biomass monitoring. Sixteen randomly selected transects from the grid will be evaluated for percent cover based on the selection of biomass stations. Depending on the logistics of the Loma Alta Slough monitoring activities and quality of data collected in the first years of this project, the number and location of monitoring sites may be adjusted in the future, following approval by the RWQCB. Additionally, data collection methods may be altered to include aerial imagery and/or remote sensing to increase the spatial representativeness of the macroalgae data. All changes to the Monitoring Plan and QAPP will be under the approval of the RWQCB and will be reflected in future annual reports of the Carlsbad WQIP.

Dissolved oxygen in Loma Alta Slough will be measured in-situ continuously throughout July and August of each year from 2016-2022. Two locations will be monitored during the two-month monitoring period, at the deepest point both downstream and upstream of the North County Transit District (NCTD) railway. Instruments will be deployed at multiple depths to measure dissolved oxygen fluctuations at the sediment-water interface (bottom), mid-depth, and one meter below the surface. Continuous DO monitoring will occur for as long as feasible before the sondes are affected by biofouling; at a minimum, one 24-hour cycle per monitoring event (i.e., July and August of each year) will be monitored.

#### Data Analysis and Reporting

Data analysis will consist of tabulation of results, load estimates, DO summary, and percent cover and biomass calculations for the Slough. Results will be compared to WQIP interim goals (which are based on the Draft TMDL numeric targets) to determine progress toward addressing the eutrophication impairments. In addition, statistical analyses and data interpretation will be conducted as related to observed trends in watershed nutrient loading and Slough macroalgae levels across monitoring cycles after at least three years of monitoring has been conducted.

Reports will present the results of field sample collections, chemical tests, and analysis of the macroalgae and nutrient samples. Annual reports will discuss the results of the analyses in relation to the two monitoring questions. Annual reports will be submitted to the RWQCB for review by January 30 of the following calendar year after each monitoring period.

#### Loma Alta Slough Monitoring Project Schedule

Consistent with the schedule of activities outlined in RWQCB Tentative Investigative Order No. R9-2014-0020 upon which the monitoring plan was designed, and the City of Oceanside's commitments reiterated through RWQCB Resolution No. R9-2014-0020, the City of Oceanside will complete the following activities:

- Submit a complete Monitoring Plan and associated QAPP to RWQCB by December 30, 2015
- Perform annual Loma Alta Slough monitoring from July 1 – August 31 each year (2016-2022)
- Prepare and submit Loma Alta Slough Annual Monitoring Reports to RWQCB by January 30 of following calendar year (2017-2023)
- Incorporate Loma Alta Slough Annual Monitoring reports into Carlsbad WQIP Annual Reports by January 31 of following calendar year (2017-2023)
- Assess progress toward achieving interim and final numeric goals (annual basis).

#### *MS4 Outfall Monitoring*

To assess progress toward achieving the interim and final goals, selected outfalls will be periodically monitored for flow conditions, e.g., rates and volumes. In addition to flow conditions, the outfalls will be monitored for the following constituents:

- Total Dissolved Solids
- Total Suspended Solids
- Total Hardness
- Total Phosphorus
- Orthophosphate
- Nitrite
- Nitrate
- Total Kjeldahl Nitrogen
- Ammonia
- Cadmium
- Copper
- Lead
- Zinc
- Total Coliform
- Fecal Coliform (or E. Coli)
- Enterococcus

Furthermore, the identified outfalls will collect data to evaluate applicable NALs and 303d listed constituents as proposed in the MS4 Outfall Monitoring Plan that provides a tailored analyte list per HA.

In order to assess program impacts, baseline flow conditions will be established. It is anticipated that this will occur during the dry weather season of 2016. Future monitoring will provide flow conditions periodically to calculate percent change from baseline conditions. These calculated percent changes in flow conditions will be the assessment used, to determine the progress towards achieving interim goals in the Loma Alta HA.

#### *Assessment*

The Loma Alta HA RAs will perform assessments of the following elements:

- Progress toward interim and final goals (Long-Term Water Quality Monitoring at Loma Alta Slough)
- Identified focus areas, and
- Jurisdictional strategies.

As new data and information become available, the RAs will perform an integrated assessment of the findings from the Long-term Water Quality Monitoring at Loma Alta Slough project and identified focused areas. The integrated assessment will evaluate the JRMP program implementation in relationship to the findings of the assessment for progress toward interim and final goals. This integrated assessment would be performed at this scale to identify relationships between the strategies implemented in the focus areas and outcomes related to the interim and final goals. The outcomes of this assessment could be used to help determine the effectiveness and efficiency of identified the strategies implemented.

Longer-term assessments will be performed at the WMA scale as appropriate data and information is collected and assessed.

### 3.2 Buena Vista Creek HA (904.2)

The Buena Vista Creek HA is the fourth largest system within the WMA. The HA extends approximately 10.6 miles inland from the coast and totals approximately 14,400 acres in area, comprising 11 percent of the WMA. The largest portion of the HA is in the City of Vista (45 percent), with the remaining in Oceanside, Carlsbad, and San Diego County (Figure 21).

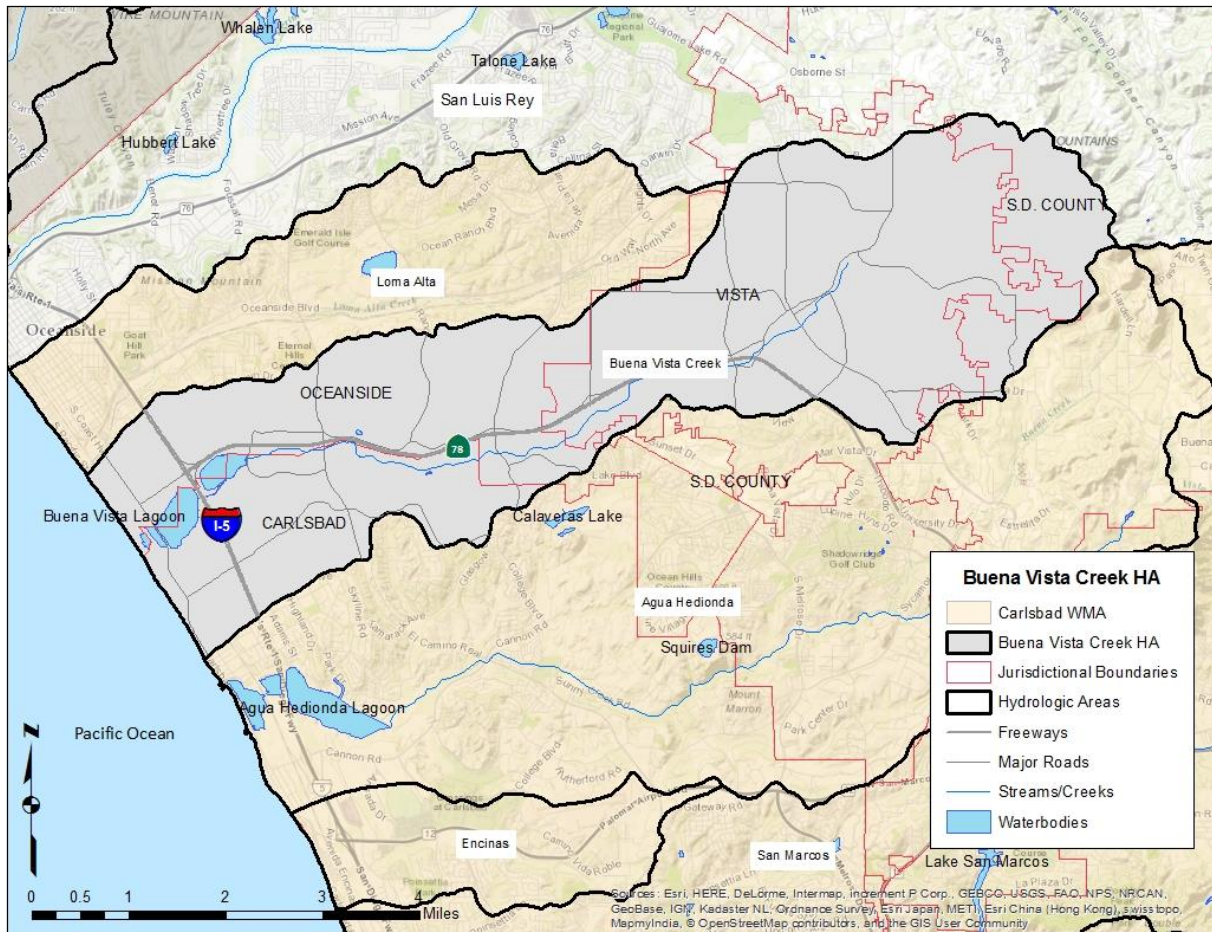


Figure 21: Buena Vista Hydrologic Area

The primary receiving waters in the HA are Buena Vista Creek, the Buena Vista Lagoon, and ultimately the Pacific Ocean.

Buena Vista Creek originates on the western slopes of the San Marcos Mountains and discharges into the Pacific Ocean via Buena Vista Lagoon. Buena Vista Lagoon is a highly valued resource located in the cities of Oceanside and Carlsbad providing 223 acres of wetland habitat. The lagoon is separated from the ocean and tidal influence by a man-made weir, creating a freshwater lagoon that is home to wildlife and many species of birds. From shoreline access points, many bird watchers observe waterfowl and shorebirds and fishing is allowed (with a license) in certain areas. The lagoon is currently listed as impaired on the 2010 303(d) list for bacterial indicators, nutrients, sedimentation, and siltation.





Buena Vista Lagoon: Upland and Wetland Habitat

Over 87 percent of the watershed is developed (12 percent is open space or undeveloped) and is comprised of the following land uses: residential (50 percent), commercial (8 percent), roads and railway (17 percent), and other land uses (13 percent). All of these land uses are potential sources of pollutants and have potential impacts on the water quality discharged from the RAs' storm drain systems. Because of the development in the HA, large sections of Buena Vista Creek have been channelized, (primarily in the City of Vista) to protect properties from flood damage.



Buena Vista Creek: Wildlife and Riparian Habitat

The impact of this channelization has been the fragmentation of riparian habitat corridors and the reduction in the benefits provided by natural channels and wetland features.

The watershed supports several native vegetation communities such as chaparral and sage scrub. Invasive plant species, such as arundo donax, have presented a problem in the Buena Vista Watershed as they smother native plants and reduce habitat areas needed to support existing wildlife communities. The watershed provides refuge for a wide array of wildlife and endangered species, such as the California Gnatcatcher, Least Bell's Vireo, Orange-throated Whiptail and the Yellow-breasted Chat.

The HA is also home to two ecological reserves, the Buena Vista Creek Ecological Reserve and the Buena Vista Lagoon Ecological Reserve. These two reserves are important components of the watershed that help protect the beneficial uses of the receiving waters.

The Buena Vista Creek Ecological Reserve is a 148-acre property with highly valued habitats that include Diegan coastal sage scrub, southern arroyo willow riparian forest, coastal and valley freshwater marsh, and non-native grasslands.



The property comprises part of an important habitat linkage between the Cities of Carlsbad and Oceanside and was acquired for conservation and enhancement of riparian habitat and adjacent uplands. The reserve is located adjacent to highway 78 between El Camino Real and College Boulevard.

The Buena Vista Lagoon Ecological Reserve is a 206-acre property of coastal freshwater lagoon habitat surrounding the Buena Vista Lagoon. Flora includes widgeon grass, pondweed, and arrow grass. Birds include cormorants, grebes, passerine birds, terns, ducks, and geese. Mammals include raccoon, skunk, and opossum, as well as vole and western harvest mouse.

In 1939, a county ordinance was approved that prohibits the discharge of firearms within the areas adjacent to the lagoon. In effect, this prohibition made the lagoon a bird sanctuary. Buena Vista Lagoon was acquired to preserve, protect and maintain coastal wetland habitat and associated wildlife species.

All of this watershed information provides context for the water quality conditions, priorities, pollutant sources, strategies, goals and schedules discussed in the next sections. Moreover, the intent of the upcoming sections is to describe how the RAs will effectively prohibit non-storm water discharges, reduce pollutants and storm water discharges from their storm drain systems, protect the beneficial uses of receiving waters from storm drain discharges, and/or achieve their goals.

### 3.2.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess water quality conditions in the Buena Vista HA, and prioritized the identified water quality conditions. These efforts included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Holding facilitated workshops to receive input from the public and the watershed consultation panel
- Reviewing and analyzing the available data and information, as summarized in Section 2.1 of this WQIP

Based upon review and analysis of the gathered data and information, the following constituent groups were found to be of *low* priority for receiving waters within the Buena Vista HA:

- Oil & grease;
- Metals;
- Organics;
- Pesticides under dry conditions;
- Nutrients under wet conditions; and
- Sediment related impacts under dry conditions.

#### 3.2.1.1 Priority Water Quality Conditions

The RAs used the information to assess the receiving water conditions (refer to Section 2.1, Table 3) and the impacts from MS4 sources (refer to Section 2.1, Table 4), to develop a “list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters” (Permit Provision B.2.c.).

The assessment of data and information for the Buena Vista HA identified indicator bacteria, sediment/siltation, and nutrients in Buena Vista Lagoon, and they are identified as PWQCs within the Buena Vista HA (Table 27).

**Table 27: Buena Vista HA Priority Water Quality Conditions**

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody
Buena Vista Lagoon	Buena Vista Creek Hydrologic Area	904.21	Indicator Bacteria	REC-1	Dry and Wet Weather	Carlsbad, Oceanside, Vista, San Diego County
Buena Vista Lagoon	Buena Vista Creek Hydrologic Area	904.21	Sediment/Siltation <sup>1</sup>	MAR	Dry and Wet Weather	Carlsbad, Oceanside, Vista, San Diego County
Buena Vista Lagoon	Buena Vista Creek Hydrologic Area	904.21	Nutrients <sup>1</sup>	MAR	Dry Weather	Carlsbad, Oceanside, Vista, San Diego County
All water bodies within the Carlsbad WMA	All	All	Trash	All	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>2</sup>
All water bodies within the Carlsbad WMA	All	All	Riparian Habitat	WARM;REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>2</sup>

<sup>1</sup> Based on 2011 LTEA, nutrients category includes at least two or more of the following pollutants: Dissolved Phosphorous; Orthophosphate; Total Phosphorous; Total Kjeldahl Nitrogen; Total Nitrogen; Eutrophication; or Benthic Algae

<sup>2</sup>This is a watershed-wide PWQC and all jurisdictions are listed. However, only the Cities of Carlsbad, Oceanside and Vista and County of San Diego are located within the Buena Vista HA.

### 3.2.1.2 Highest Priority Water Quality Conditions

Once the PWQCs were identified, the next step was to “identify the highest priority water quality conditions to be addressed by the WQIP and provide the rationale for selecting a subset of the [priority] water quality conditions identified.” (MS4 Permit) The RAs established the process outlined in Section 2.2 to identify the HPWQCs within the Carlsbad WMA, where applicable. Figure 7 provides an illustration of the process.

Applying the process outlined in Section 2.2, there were no HPWQCs identified by the cities of Oceanside, Vista, and Carlsbad for the Buena Vista HA at this time. Instead, the City of Oceanside identified eutrophic conditions in the Loma Alta HA as the highest priority (see Section 3.1.2 for rationale) while the cities of Vista and Carlsbad identified hydromodification impacts and improvement of riparian health in the Agua Hedionda HA (see Section 3.3.2 for rationale).

The PWQCs of indicator bacteria, nutrients, and sediment are identified for the Buena Vista Lagoon. The Cities of Oceanside and Carlsbad are collaborating with the San Diego Association of Governments (SANDAG) on the Buena Vista Lagoon Enhancement Project. This project includes engineering studies and preparing an Environmental Impact Report (EIR). The overall purpose of the Buena Vista Lagoon Enhancement Project as noted in the Draft EIR is to “enhance the biological and hydrological functions of the Buena Vista Lagoon to address sedimentation and invasive vegetation encroachment, as well as declining coastal biodiversity, degrading water quality, water circulation restriction, and increased vector concerns”. A minimum of four alternatives were proposed for evaluation in the EIR analysis and include:

- 1) Freshwater enhancement alternative
- 2) Saltwater enhancement alternative
- 3) Saltwater/freshwater hybrid regime enhancement alternative; and
- 4) No project alternative

The Draft EIR was released in July 2015, and the public comment period closed on September 1, 2015. At the time of this writing, the Final EIR had not been released. The Final EIR will provide the recommended alternative for the Buena Vista Lagoon. The Cities of Oceanside and Carlsbad will continue to collaborate with SANDAG on the Buena Vista Lagoon Enhancement Project and continue to provide input on long-term lagoon management resolutions that will benefit the PWQCs identified for the Buena Vista Lagoon.

While there are currently no HPWQCs identified for the Buena Vista HA, the Cities of Oceanside, Vista and Carlsbad will implement strategies including core jurisdictional program strategies (Permit Sections E.2-E.7) and planned optional strategies (Permit Section B.3.b (1)(b)) within this HA. All strategies are identified in Table 29, which includes planned optional strategies and WMA strategies. The strategies selected by the RAs support the objectives identified in the Buena Vista Lagoon Enhancement Project Draft EIR by reducing the impacts and contributions from the watershed into the lagoon. This will be achieved through the reduction of storm water discharges from the RAs storm drain system, implementation of structural BMPs (i.e. Paseo Santa Fe Green Street Project), and restoration efforts (Buena Vista Creek at Brengle Terrace Restoration).

### 3.2.2 Buena Vista Creek HA Sources

As noted in Section 2.2, the pollutants found in wet weather urban runoff are generally associated with land uses in the tributary areas. Rainfall runoff mobilizes and transports pollutants from areas that are collectively associated with particular land uses. This is opposed to the pollutants found in dry weather

urban runoff that are generally associated with identifiable-source discharges such as residences, construction sites, or commercial facilities.

The RAs within Buena Vista HA have identified and targeted land uses and areas (residential) that are suspected of causing and contributing to PWQC loading within the HA. Figure 22 presents the land uses within the Buena Vista HA. These areas and land uses are described in more detail in strategies included in Section 3.2.4.1.

In addition to the identified land uses, Table 28 presents a listing of inventoried sources in the Buena Vista Creek HA and their association with PWQCs based on source-loading potential (2011 LTEA). The PWQCs are highlighted in green and likely stem from the following sources (in blue): agriculture, animal facilities, nurseries/greenhouses, eating or drinking establishments, and residential facilities. The associations identified in the below table are based on the LTEA process developed for associating known pollutant sources with the potential for those sources to generate pollutant loadings for the identified pollutant categories. The Buena Vista Creek HA was analyzed using the most recent available data to quantify the inventoried sites/facilities that are likely to contribute to PWQC loading, helping to shape strategies within this area.

While the 2011 LTEA did not analyze or include riparian habitat degradation, the source and pollutants included in the table have the potential to degrade riparian habitat within the HA by contributing pollutants to the MS4. Increased impervious surfaces and hydromodification impacts are also sources contributing to riparian habitat degradation.

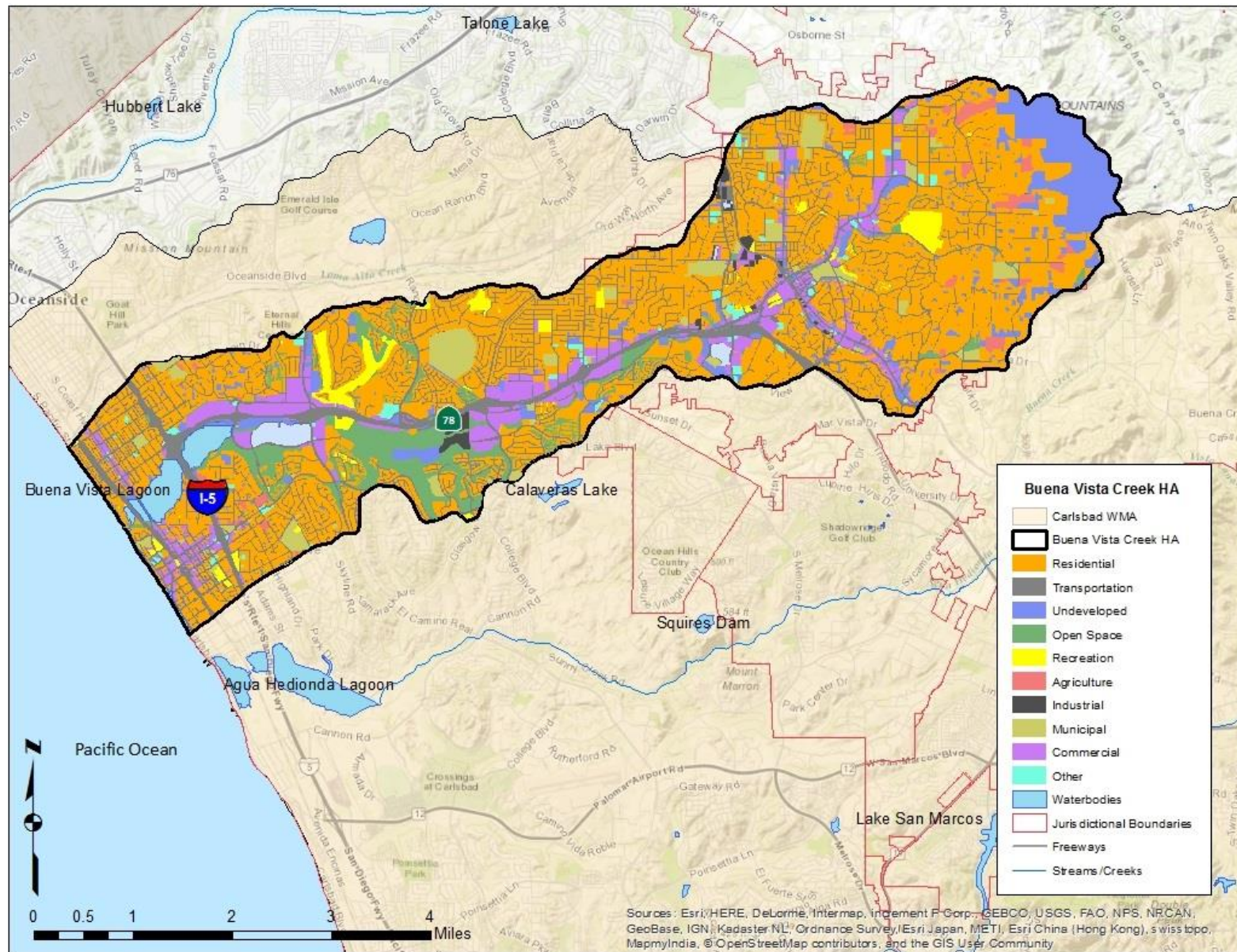


Figure 22: Buena Vista Hydrologic Area Land Uses



**Table 28: Pollutant Generating Sources – 904.2 Buena Vista Creek Hydrologic Area**

Inventory Sites/Facilities <sup>1</sup>	Quantities <sup>2</sup>	Pollutant Source Loading Potential <sup>3</sup>									
		Metals	Oil & Grease	Sediment	Pesticides	Nutrients	Bacteria/Pathogens	Dissolved Minerals	Organics	Trash	Toxicity
Aggregates/Mining	1	L	L	L	UL	UL	UL	UL	L	UK	UK
Agriculture	1	L	UL	L	L	L	L	UK	UL	UK	UK
Animal Facilities	5	N	UL	L	UK	L	L	N	L	L	UK
Auto Repair, Fueling, or Cleaning	131	L	L	UL	UL	UK	UL	L	L	L	UK
Auto Parking Lots or Storage	16	L	L	L	UK	UK	UK	UL	L	UK	UK
Auto Body Repair or Painting	19	L	L	UL	UL	UL	UL	L	L	L	UK
Nurseries/Greenhouses	28	L	UL	L	L	L	L	UL	UL	UK	UK
Concrete Manufacturing	1	L	L	L	UL	UL	UL	UL	L	UK	UK
Eating or Drinking Establishments	391	N	L	UL	UK	UK	L	UL	L	L	UK
Equipment Repair or Fueling	8	L	L	UL	UL	UK	UL	UL	L	L	UK
Fabricated Metal	6	L	L	UK	UK	UK	UL	UL	L	UK	UK
Food Manufacturing	3	UL	UL	UL	UL	UL	UL	UL	UL	UK	UK
General Contractors	26	UL	UL	L	UL	UL	UL	UL	UL	L	UK
General Industrial	10	L	L	UK	UK	UK	UK	UK	L	L	UK
General Retail	94	UL	UL	L	UL	UL	UL	UL	UL	UK	UK
Health Services	2	N	UL	L	UK	L	UL	UK	L	UK	UK
Institutional	2	L	UK	UK	UK	UK	UL	UK	UK	UK	UK
Motor Freight	3	L	L	UK	UK	UK	UK	UL	L	UK	UK
Offices	36	UK	UK	UK	UK	UK	UK	UK	UK	L	UK
Parks and Rec (incl. Golf, Cemetery)	3	UK	UK	UK	UK	L	UK	UL	UK	L	UK
Pest Control Services	1	N	UK	N	L	N	UK	N	UK	UK	UK
Pool and Fountain Cleaning	1	N	N	N	N	UK	N	N	UK	UK	UK
Recycling & Junk Yards	2	L	L	L	UL	UL	UL	L	L	L	UK
Stone/Glass Manufacturing	3	L	L	L	UL	UL	UL	UL	L	UK	UK
Storage/Warehousing	9	L	L	L	UL	UL	UL	UL	L	UK	UK
Municipal	81	N	N	L	N	N	UK	UL	N	L	UK
Construction	Varies <sup>4</sup>	UL	UL	L	UL	UL	UL	L	UL	L	UK
Residential	7,345 acres	L	L	L	L	L	L	L	L	L	UK

The highest TTWQ rated sources within each HA based on the HPWQC are identified in the table (yellow highlight signifies HPWQC). The HPWQC is associated with the sources that are likely to generate those pollutants (blue highlight). The PWQC is highlighted in green and the associated sources that are likely to generate those pollutants are depicted with an “L”.

1: Other sources are not reported in this table including: Land Development and Non-Inventoried Businesses

2: Quantities based on the RAs FY 2012 JURMP Annual Reports

3: Pollutant Source Loading Potential taken from LTEA 2011; N = None, UK = Unknown, UL = Unlikely, L = Likely

4: The quantity of construction sites is dynamic due to projects starting and completing at any given time

NOTE: The 2011 LTEA did not include degradation of riparian habitat. However, all sources and pollutants included in the table can impact riparian habitat degradation.

### 3.2.3 Buena Vista HA Goals and Schedules

Based on the process outlined in Section 2.1, there are currently no HPWQCs identified in the Buena Vista HA at this time. In the absence of a HPWQC, no interim and final goals for the Buena Vista HA are currently established.

However, because addressing various pollutants and conditions is necessary to meet water quality objectives, the Buena Vista HA will eventually be targeted for remediation efforts that are consistent with those assigned to highest priority pollutants and/or conditions. In fact, some of these efforts are already underway, such as the three-phase green street project the City of Vista is implementing in a blighted, economically disadvantaged business area located within proximity to Buena Vista Creek.

### 3.2.4 Buena Vista HA Strategies

Based on the process and information identified in Section 2.4, the RAs within the Buena Vista HA identified the strategies to be implemented, or triggered for implementation, to address the PWQCs to the maximum extent practicable (MEP). In addition to the focus placed on the HPWQC, the RAs' strategies will be implemented within the respective RA's jurisdiction to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, and protect the beneficial uses of the receiving waters from MS4 discharges in order to achieve or maintain the interim and final numeric goals. Furthermore, in some cases, strategies include those that improve or enhance the natural beneficial watershed features: wetlands; riparian habitat; upland vegetation; and connectivity.

Table 29 identifies the Water Quality Improvement Strategies to be implemented throughout the entire Buena Vista HA. The Buena Vista PWQCs are highlighted in green in the table, and the strategies that target those conditions are identified. The table includes planned strategies to be implemented as part of the Copermittees' core programs and additional, "optional" strategies that Copermittees will implement to target the PWQCs.<sup>14</sup> In many cases, RAs have enhanced their jurisdictional strategies to target specific areas or sources that are causing or contributing to the PWQCs in the Buena Vista HA. HA-specific geographic characterizations and prioritization are described in Section 3.2.4.1 and are noted in Table 29 where applicable. Additional optional strategies are also identified in Table 29. The additional optional strategies may be implemented based on a variety of triggers, such as progress made toward numeric goals. Strategies numbered 1-13 in Table 29 are described in Section 2.4 and further detailed in each RAs' JRMP. All other strategies are described in the subsections below.

Through improvements in discharged water quality, identified strategies within the HA are individually and collectively expected to have positive impacts on the receiving waters including the Buena Vista Lagoon. In addition to the specific activities related to the Buena Vista Lagoon Enhancement Project, the RAs' implementation of the identified strategies supports the enhancement project's overall objectives.

As the RAs implement strategies and analyze data, it is expected that these strategies and schedules may change through an iterative and adaptive management process. The adaptive management process is presented in Section 2.5.

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<sup>14</sup> Core programs address the requirements of Permit Provisions E.2 through E.7, and their inclusion in the Water Quality Improvement Plan is discussed in Permit Section B.3.b.(1)(a). The requirements applicable to additional, "optional" strategies are discussed in Permit Provision B.3.b.(1)(b).

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Table 29: Buena Vista HA Strategies

Water Quality Improvement Plan Strategies			Jurisdiction/Area				Target Sources								Target Pollutant, Stressor, or Condition										Target Temporal Benefit		Implementation Schedule									
			City of Carlsbad	City of Vista	City of Oceanside	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)			
PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b)))																																				
1	Administrative BMPs	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
2	Investigations	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
3	Development and Redevelopment Requirements	HA Wide	HA Wide	HA Wide	HA Wide							•			•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
4	Construction Site Inspections	HA Wide	HA Wide	HA Wide	HA Wide				•						•	•					•		•	•	•	•	•	•	•	•	•	•	•			
5	Existing Development Facilities, Areas and Activities Inspections	HA Wide	HA Wide	HA Wide	HA Wide	•	•		•				•		•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
6	MS4 Inspections/Cleaning	HA Wide	HA Wide	HA Wide	HA Wide									•	•	•	•				•	•	•	•	•	•	•	•	•	•	•	•	•			
7	Street Sweeping	HA Wide	HA Wide	HA Wide	HA Wide							•		•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
8	General Education and Outreach	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•			•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
9	Employee Training <sup>2</sup> /Focused Training	HA Wide	HA Wide	HA Wide	HA Wide	•						•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
10	Enforcement	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
11	Partnership Program(s)	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
12	Program for Retrofitting Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
13	Program for Stream, Channel and/or Habitat Restoration in Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•			
14	Targeted Increased Street Sweeping	CB-PA1, CB-PA2 & CB-PA3	-	-	-	•	•		•	•		•	•	•	•	•					•		•		•	•	•	•	•	•	•	•	•			
15	Perform Property-Based Inspections/Patrol	HA Wide		-	-	•	•		•	•	•			•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•			
16	Provide Maximum Response Time for Complaints Received via Storm Water Hotline	HA Wide	-	-	-	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•			
17	Enhanced Education Program	CB-PA1, CB-PA2 & CB-PA3	Buena Vista 06 Basin -	-	-	•	•		•	•				•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•			
18	Implement Program Efficiencies	HA Wide	-	-	-	•	•	•	•			•		•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•			
19	Paseo Santa Fe Green Street Project – Phase 1	-	Buena Vista 06 Basin	-	-		•			•	•	•	•	•	•				•		•		•	•	•	•	•									

Table 29: Buena Vista HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area				Target Sources								Target Pollutant, Stressor, or Condition									Target Temporal Benefit		Implementation Schedule								
		City of Carlsbad	City of Vista	City of Oceanside	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
20	Paseo Santa Fe Green Street Project – Phase 2		Buena Vista 06 Basin				•			•	•	•	•	•	•		•		•	•	•		•	•						•	•		
21	Buena Vista Creek at Brengle Terrace Restoration		Buena Vista 06 Basin							•	•			•		•	•		•	•	•		•	•			•	•					
ADDITIONAL OPTIONAL STRATEGIES (PERMIT SECTION B.3.b. (1) (b)) (more information on these strategies and criteria for initiating them can be found in Section 3.2.5.2.2)																																	
22	Implement Structural or Retrofit BMPs	HA Wide	Buena Vista 06 Basin	HA Wide	HA Wide	•			•	•		•	•	•	•	•	•	•	•	•	•	•			Based on appropriate criteria for initiating (See Section 3.2.5.2.2 for information)								
23	Buena Vista Lagoon Enhancement Project	HA Wide	-	HA Wide	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.2.5.2.2 for information)								
24	Implement Offsite Alt. Compliance Program	HA Wide	-	HA Wide	HA Wide	•	•		•	•			•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.2.5.2.2 for information)									
25	Phase 3 of Green Street Project—Paseo Santa Fe	-	Buena Vista 06 Basin	-	-					•	•	•		•	•	•	•		•	•	•	•	•	•	Funding for design has been acquired. See Section 3.2.5.2.2 for details on criteria to initiate construction.								
WATERSHED MANAGEMENT AREA STRATEGIES (PERMIT SECTION B.3.b. (2))																																	
26	Integrated Regional Watershed Management (IRWM)	WMA wide	WMA wide	WMA wide	WMA wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating								
27	Sustainable Landscape Incentive Program	WMA wide	WMA wide	WMA wide	WMA wide	•	•		•					•			•	•			•	•			Based on appropriate criteria for initiating								

<sup>1</sup> Optional Strategies. Note that where optional strategies are listed under the Planned Jurisdictional Strategies category, RAs have committed to implementing them, so no additional detail on circumstances that would trigger those optional strategies is necessary.



### 3.2.4.1 Geographic Characteristics and Prioritization

Focusing program efforts in specific geographic areas to address known or suspected sources of discharges and pollutants are expected to improve the effectiveness of the strategies and activities.

Based on the RAs' review of the characteristics of the Buena Vista Creek HA, several focus areas were selected for concentrating program efforts. Focus areas were selected based on identified sources that are associated with contributing to the PWQCs, outfall information collected by RAs, and other identified characteristics that support the areas as priority areas. These focus areas include CB-PA1, CB-PA2, CB-PA3, and Buena Vista Basin (BV06). The strategies for these focus areas are summarized below.

#### 3.2.4.1.1 CB-PA1 Focus Area

The CB-PA1 focus area is located immediately south of the Buena Vista Lagoon. This area is a mixture of single family residential, commercial and multi-family land uses and includes homes, commercial buildings, apartment complexes, common areas, a school and recreational park areas that include landscaping and turf, which are known types of contributors to non-storm water discharge resulting and potential pollutant loadings. See Figure 23.

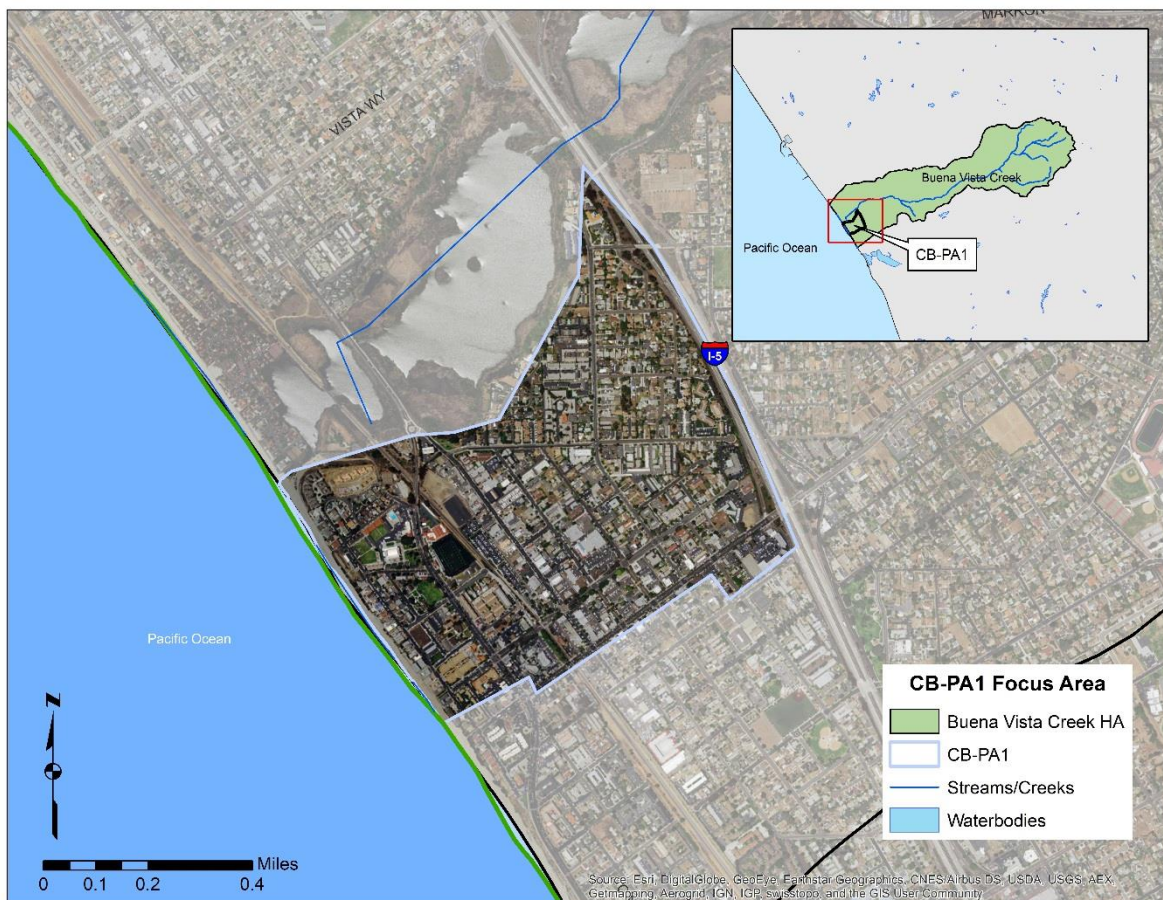
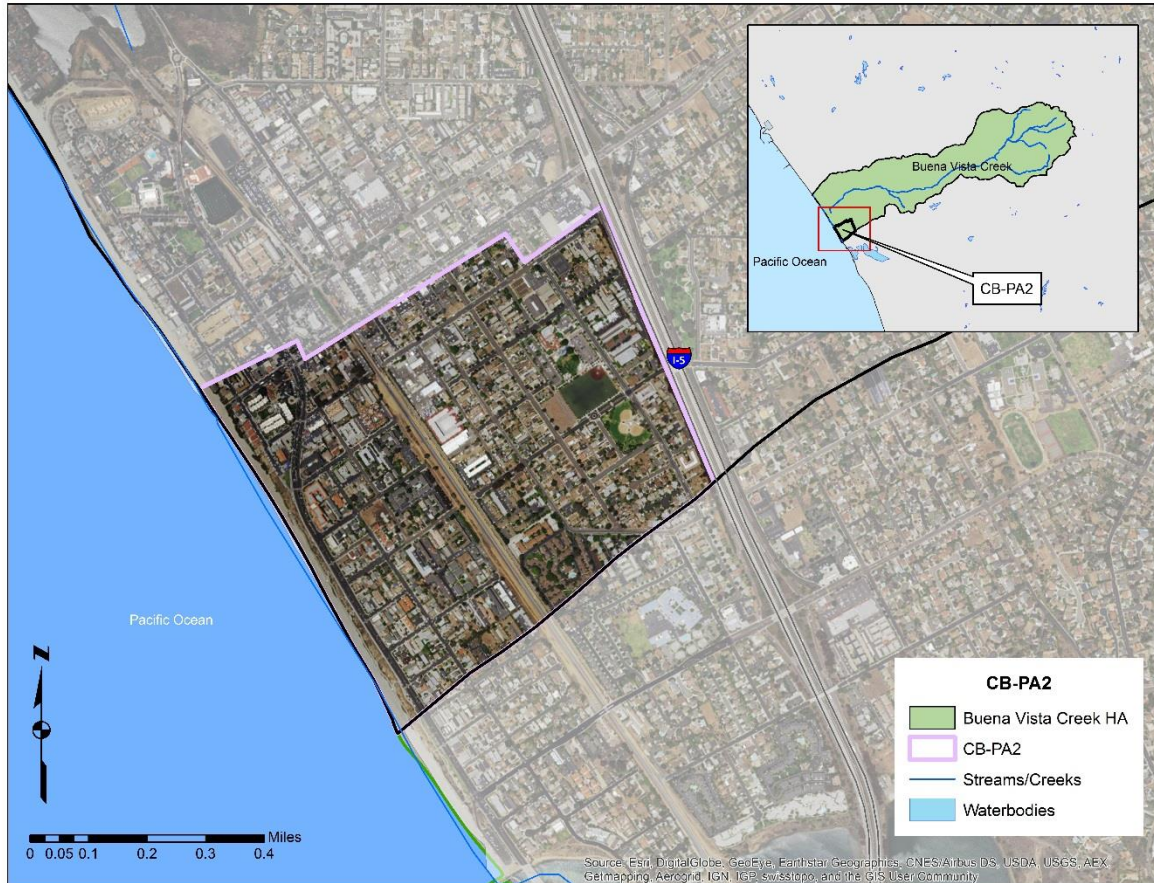


Figure 23: CB-PA1 Focus Area – Buena Vista Creek HA

### 3.2.4.1.2 CB-PA2 Focus Area

The CB-PA2 focus area is split into two drainage areas located south of Carlsbad Village Drive and CB-PA1. The northern portion of the focus area drains to the north towards Buena Vista Lagoon. The southern portion drains south towards Agua Hedionda Lagoon. This area is a mixture of single family residential properties, commercial and multi-family land uses and includes homes, commercial buildings, apartment complexes, common areas, a school and recreational park areas that include landscaping and turf, which are known types of contributors to non-storm water discharge resulting and potential pollutant loadings. See Figure 24.

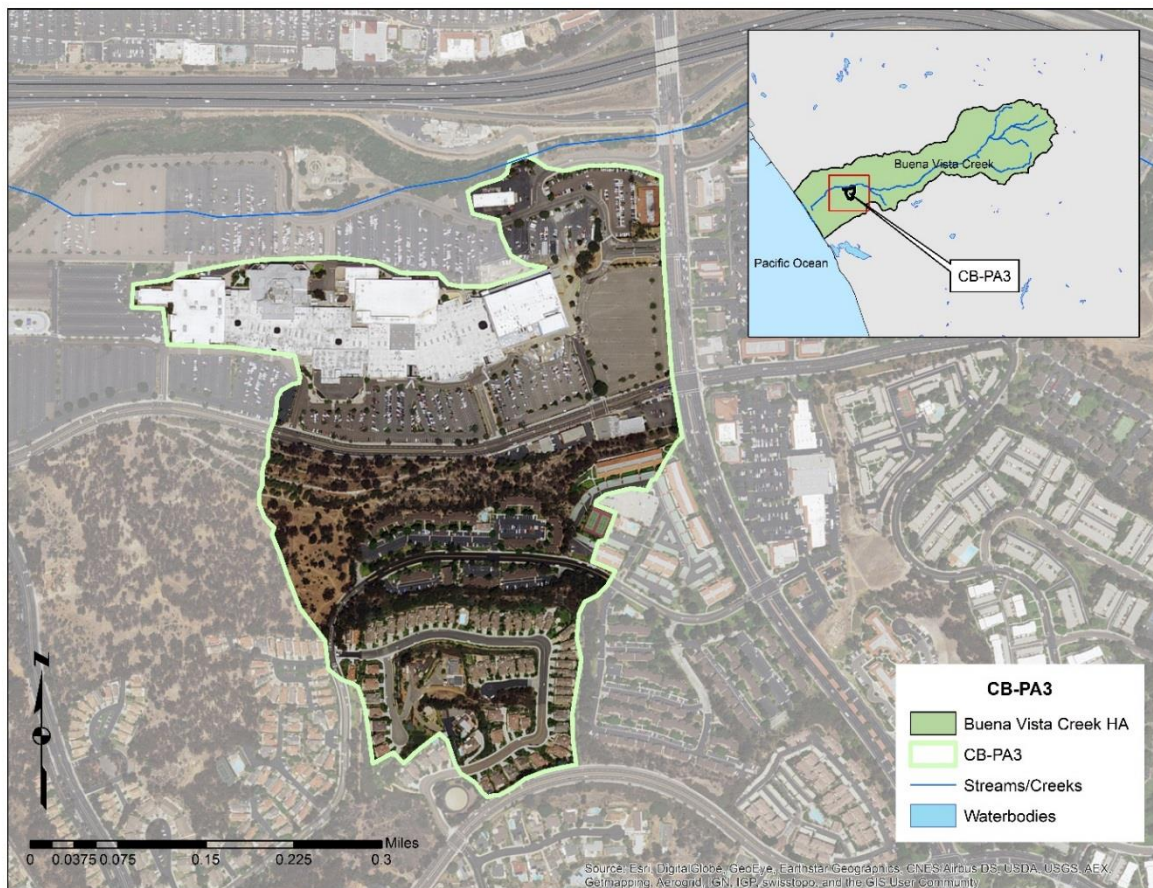


**Figure 24: CB-PA2 Focus Area – Buena Vista Creek**



### 3.2.4.1.3 CB-PA3 Focus Area

The CB-PA3 focus area is located approximately one-third of the way up the Buena Vista Creek HA. This area is a mix of single-family residential properties along with a portion of the Carlsbad Mall with a single outfall. See Figure 25. Monitoring of this area has identified persistent flow and bacteria exceedances from the outfall.



**Figure 25: CB-PA3 Focus Area – Buena Vista Creek**

### 3.2.4.1.4 City of Vista –Buena Vista 06 (BV06) Basin

The Buena Vista 06 (BV06) Basin is a large sub-basin in the upper one-third of the Buena Vista Creek HA, see Figure 26. The basin is completely within the City of Vista jurisdictional boundaries. The basin has high-density land use with a mixture of single family residential, commercial and multi-family land uses and includes homes, commercial buildings, apartment complexes, common areas, several schools and recreational park areas that include landscaping and turf, which are known types of contributors to non-storm water discharge and associated pollutants.

The majority of this basin was developed prior to implementation of the City’s Standard Urban Stormwater Mitigation Plan (SUSMP); therefore, relatively few treatment control BMPs have been established. As a result, the City of Vista identified a one-mile long, three-phase green street project to be implemented in this area. The Paseo Santa Fe Green Street Project is located at the southern portion of the focus area along South Santa Fe Avenue. Most of the project is located immediately adjacent to the focus area; however, portions drain to the focus area. The project will convert an existing four lane street to a two-lane street that includes storm water structural BMPs, such as Silva cells, pervious pavement,

and bioretention facilities. The project includes water quality enhancements that will be incorporated into the revitalization of the Paseo Sante Fe corridor in Vista. Consistent with the vision of the project, the proposed enhancements use low-impact development (LID) approaches to provide multiple benefits that include upgrades to existing infrastructure, additional attractive and low-maintenance landscaped areas, improved flood control and water quality, and use of sustainable/green practices that attract new businesses.

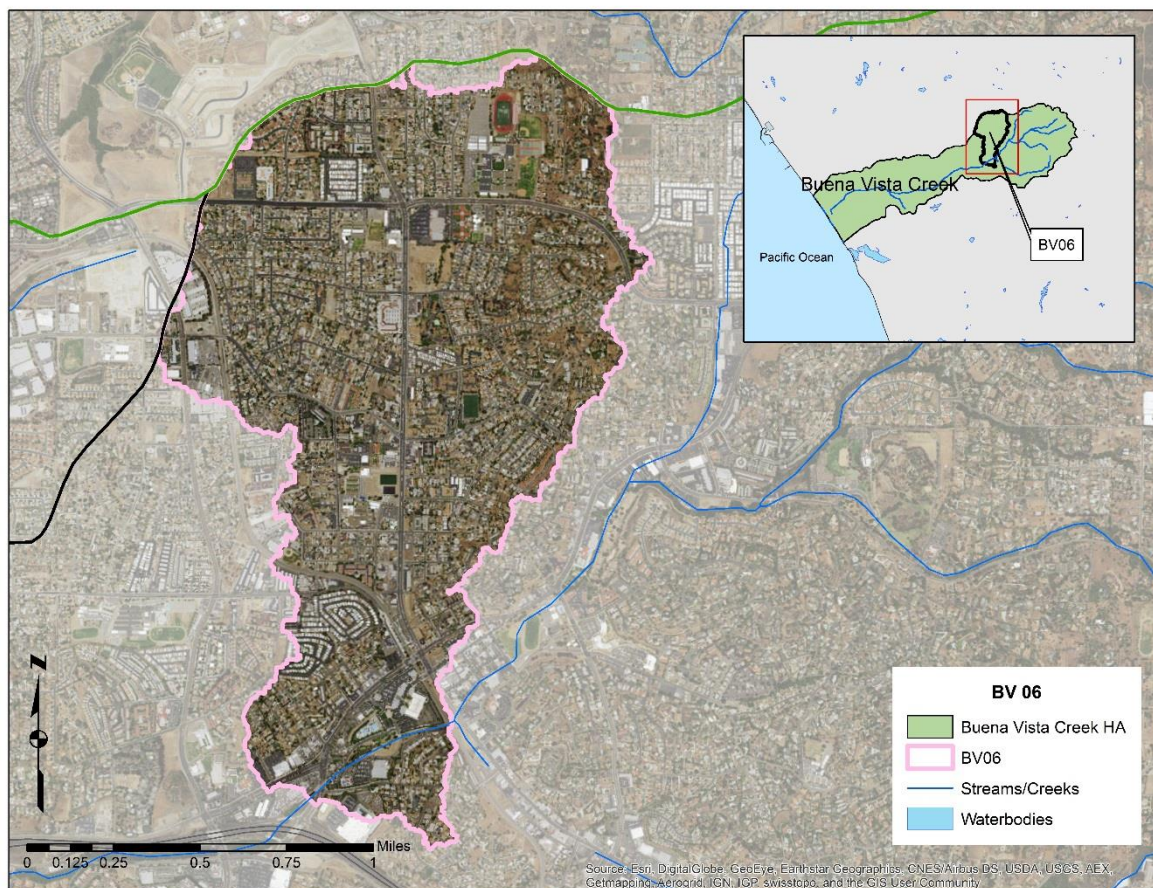


Figure 26: BV06 Basin Focus Area

### 3.2.4.2 Buena Vista HA Strategy Descriptions

The following sections describe the planned jurisdictional and planned optional strategies, additional optional strategies, and watershed management area strategies to be implemented within the Buena Vista HA.

#### 3.2.4.2.1 Planned Jurisdictional and Optional Strategies

The planned jurisdictional and optional strategies to be implemented within the Buena Vista HA are described below. These strategies include the core jurisdictional program elements (Permit Provisions, E.2. through E.7.)<sup>15</sup>, as described in Section 2.4.2 of this WQIP, enhancements of the core jurisdictional program elements, and optional strategies. Optional strategies that are already planned for implementation do not include additional detail on circumstances that would trigger implementation or funding and resources.

<sup>15</sup> Core jurisdictional program elements (Strategies 1-13 in Table 6) are described in Section 2.4.2 of this WQIP and are not summarized in this section.



### Strategy 14 (Table 29) – Targeted Increased Street Sweeping

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA1, CB-PA2 & CB-PA3

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Trash; Sediment</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Targeted street sweeping in focus areas will be a minimum frequency of every two weeks

### Strategy 15 (Table 29) - Perform Property-Based Inspections/Patrol

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA1, CB-PA2 & CB-PA3

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

- 1) Perform property-based inspections/patrol inspections of *each* property in the CB-PA1, CB-PA2, and CB-PA3 at least once annually. The inspections are expected to result in the elimination of anthropogenic dry weather flows, but will also affect the wet weather loading potential and provide opportunities for identification of potential retrofit projects. These inspections will include:
  - a. Visual inspection of all public streets
  - b. Inspections of each existing development property:
    - i. Each commercial/industrial property
    - ii. Each residential property
  - c. Identification of active dry weather discharges and evidence of historical discharges
  - d. Identification of pollutant generating activities and areas that may contribute wet weather storm water pollutant loading
  - e. Performing follow-up with property owner/manager on identified issues to resolve discharges and/or potential pollutant discharges

### Strategy 16 (Table 29) - Provide Maximum Response Time for Complaints Received via Storm Water Hotline

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA1, CB-PA2 & CB-PA3

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; General Public; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Maintain a maximum response time to focus areas for complaints received via Storm Water Hotline, or other mechanism. The City will respond and arrive on-site *within* 45 minutes of notification to find and eliminate any unauthorized discharge, identify the responsible party and minimize impacts to receiving waters. This response time is expected to eliminate discharges while they are occurring and provide an opportunity to immediately educate or enforce as necessary.

**Strategy 17 (Table 29) - Enhanced Education Program****Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA1, CB-PA2 & CB-PA3; City of Vista: Buena Vista 06 Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Enhancements to education program to include:

- 1) Priority pollutant specific education and outreach program to be conducted in CB-PA1, CB-PA2, and CB-PA3 for residents and commercial facilities related to priority pollutants within the HA. The materials will have an emphasis on discharges to the City's MS4 and the receiving waters impacts.
- 2) Developing and implementing a training/seminar for property managers and others that have direct responsibility for common areas within HOAs and commercial properties. Educational materials and information will be developed and provided to the managers for them to distribute to their residents and tenants.
- 3) As the CB-PA1 focus area is a high-tourist area, the City will develop outreach materials directed specifically to out-of-jurisdiction visitors, including materials for distribution through hotels, long-term rental properties and commercial businesses.
- 4) As part of the residential outreach program, the City of Carlsbad will work with residents and property owners to educate through various means, which may include school programs, block parties or one-on-one meetings.

**Strategy 18 (Table 29) - Implement Program Efficiencies****Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA1, CB-PA2 & CB-PA3

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City is implementing a new computer database, compatible with mobile devices, which will increase the City's response time to Illicit Discharge Detection and Elimination (IDDE) reports, discoveries, complaints and monitoring investigations. This new computer database will also streamline inspections and allow for review of previous information while in the field. It is also anticipated to speed the enforcement process as well expedite the capture of data for field follow-up. These increases in the speed at which data is collected and assimilated will improve the efficiencies of the City's storm water program.

**Strategy 19 (Table 29) - Paseo Santa Fe Green Street Project – Phase 1****Jurisdiction/Area for Implementation:** City of Vista: Buena Vista 06 Basin

<b>Target Sources:</b> Industrial and Commercial Facilities/Owners; General Public; Land Development and Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Oil and Grease; Sediment	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The Paseo Santa Fe Green Street Project, Phase 1, is located at the southern portion of the focus area along South Santa Fe Avenue. Most of the project is located immediately adjacent to the focus area, however portions drain to the focus area. The project will convert an existing four-lane to a two-lane street that includes storm water structural BMPs, such as Silva cells, pervious pavement, and bioretention facilities. The project includes water quality enhancements that will be incorporated into the revitalization of the Paseo Santa Fe corridor in Vista. The



**Continued from previous page**

Revitalization Project will transform this commercial corridor into a mixed-use, destination-oriented, and pedestrian-friendly district connected to mass-transit. Consistent with the vision of the project, the proposed enhancements use low-impact development (LID) approaches to provide multiple benefits that include upgrades to existing infrastructure, additional attractive and low-maintenance landscaped areas, improved flood control and water quality, and use of sustainable/green practices that attract new businesses. Enhancements include landscaped areas/pervious surfaces, bioretention strips and Silva cells that will treat storm water runoff that includes pollutants such as bacteria, sediment, and oil/grease. Phase 1 of the project will be completed in spring 2016.

**Strategy 20 (Table 29) - Paseo Santa Fe Green Street Project – Phase 2**

<b>Jurisdiction/Area for Implementation:</b> City of Vista: Buena Vista 06 Basin		
<b>Target Sources:</b> Industrial and Commercial Facilities/Owners; General Public; Land Development and Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Oil and Grease; Sediment	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

The second phase of the Paseo Santa Fe Green Street Project includes features similar to that of Phase 1. The project will convert an existing four-lane to a two-lane street that includes storm water structural BMPs, such as silva cells, pervious pavement, and bio-retention facilities. The project includes water quality enhancements that will be incorporated into the revitalization of the Paseo Santa Fe corridor in Vista. Actual construction of phase 2 is expected to begin in fiscal year 2018-19 and be completed in fiscal year 2019-20. If funding is secured Phase 3 will be implemented concurrent with Phase 2.

**Strategy 21 (Table 29) – Buena Vista Creek at Brengle Terrace Restoration**

<b>Jurisdiction/Area for Implementation:</b> City of Vista: Buena Vista 06 Basin		
<b>Target Sources:</b> General Public; Land Development and Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Heavy Metals; Nutrients; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

This project is focused on restoring a stream riparian corridor along the southwestern side of Brengle Terrace Park in Vista. Non-native plants such as palms and eucalyptus will be removed and replaced with over 200 native trees and shrubs. The creek slope will be stabilized by implementing erosion control BMPs. It is expected these improvements will result in reduced bank erosion, improved water quality, and natural habitat enhancement and preservation. The project should be completed in 2016.

**3.2.4.2.2 Buena Vista HA Optional Strategies**

This section describes the additional optional strategies that will be triggered for implementation in response to specific conditions that are described in accordance with the requirements of Permit Provision B.3.b(1)(b).

**Strategy 22 (Table 29) - Implement Structural or Retrofit BMPs**

<b>Jurisdiction/Area for Implementation:</b> HA Wide		
<b>Target Sources:</b> Municipal Fixed Facilities; Residential; General Public; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

Implement structural (engineered) BMPs or retrofitting existing structural BMPs to address flow and/or pollutant issues

***Continued from previous page***

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the Cities to implement.

**Resources Required to Implement Strategy:**

Voter/council approval of projects; staffing necessary to implement the planning, design and construction of such projects; project funding; required permits from state and federal regulatory agencies.

**Timeline to Secure Resources for Optional Strategy:**

If implemented, structural BMPs will be integrated into the City's Capital Improvement Program for planning, design and construction. Many of the City's typical capital projects are funded through dedicated sources, e.g., transportation tax dollars. Structural BMPs will have to identify alternative sources of funding, e.g., grants or partnerships, and therefore may take longer to process than typical capital projects. It is estimated that structural BMP projects may take five years to secure the resources necessary to initiate each project within the strategy.

**Strategy 23 (Table 29) – Buena Vista Lagoon Enhancement Project**

**Jurisdiction/Area for Implementation:** Oceanside and Carlsbad Jurisdictions within the Buena Vista HA

**Target Sources:**

Municipal Fixed Facilities; Industrial & Commercial Facilities/Owners; Construction Sites & Personnel; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways & Parking Facilities; MS4

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

The Buena Vista Lagoon Enhancement Project is a being led by the San Diego Association of Governments (SANDAG) in partnership with Caltrans and the cities of Carlsbad and Oceanside. The Buena Vista Lagoon Enhancement Project includes engineering studies and the preparation of an Environmental Impact Report (EIR) to analyze possible approaches to the enhancement of the lagoon. The final EIR has not been release as of June 2016. Numerous federal, state and local agencies and organizations have cooperated in the past in an effort to gain consensus on a solution. Future enhancements to the Buena Vista Lagoon could serve as mitigation for potential impacts from the I-5 and rail improvements.

**Circumstances to Trigger the Implementation of the Strategy:**

The City of Oceanside is waiting for the final EIR to be released which will recommend the preferred enhancement alternative; there are four alternatives being assessed. Based on the alternative selected, funds for implementation will be explored at that time. It is also assumed that some type of agreement will need to be formulated between agencies in order to move forward with an enhancement project.

**Resources Required to Implement Strategy:**

Voter/council approval of projects; staffing necessary to implement the planning, design and construction of such projects; project funding.

**Timeline to Secure Resources for Optional Strategy:**

The timeline is dependent on the final alternative design agreed upon and funding secured which has not identified.

**Strategy 24 (Table 29) - Implement Offsite Alternative Compliance Program**

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA1, CB-PA2 & CB-PA3, City of Oceanside; County of San Diego

**Target Sources:**

Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

An alternative compliance program allows development projects to use offsite BMPs or rehabilitation projects to comply with storm water requirements. These BMPs reduce multiple pollutants, including nutrients. Copermittees have

**Continued from previous page**

funded a Watershed Management Area Analysis and a water quality equivalency standards development process, which are necessary initial steps if an alternative compliance program is to be developed.

The County is currently implementing Phase 1 of the Offsite Alternative Compliance Program as defined in the WPO, Section 67.811(b)(4)(c). This phase allows for an Applicant-Implemented Offsite Alternative Compliance Project (ACP) project. This program became effective on February 26, 2016 and allows for a developer to wholly or partially satisfy their on-site storm water compliance obligations through the implementation of an ACP that is owned or constructed by the PDP project applicant.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) The Copermittees finalize water quality equivalency standards for riparian habitat and submit it to the RWQCB for approval, 2) the RWQCB approves the water quality equivalency standards, 3) an acceptable framework for allocating credits for offsite BMPs is developed by the Copermittees and approved by the City, 4) the program does not require the City to take on unfunded long-term maintenance responsibility for BMPs used as a means of compliance by private projects, and 5) adequate staffing resources have been obtained.

**Resources Required to Implement Strategy:**

Staffing resources are needed to develop and administer the program. The level of staff administration needed will depend on the number of projects that propose to comply via offsite alternative compliance and the complexity of tracking offsite BMP maintenance. Staffing resources are estimated at 0.5 to 1.0 FTE to develop the program initially and 0.5 FTE to administer the program on an ongoing basis.

**Timeline to Secure Resources for Optional Strategy:**

Following the finalization of water quality equivalency and crediting systems on a regional basis, it is anticipated that another one to three years would be needed to develop and implement the program.

**Strategy 25 (Table 29) - Phase 3 of Green Street Project—Paseo Santa Fe**

**Jurisdiction/Area for Implementation:** City of Vista: Buena Vista 06 Basin

<b>Target Sources:</b>	<b>Target Stressors/Pollutants/Conditions:</b>	<b>Temporal Benefit:</b>
General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities	Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

Implement Phase 3 of Green Street Project—Paseo Santa Fe—to address pollutant issues, including bacteria and nutrients.

**Circumstances to Trigger the Implementation of the Strategy:**

Construction on this project will begin in approximately 3 years if grant funds can be obtained. Making adequate progress toward meeting numeric goals could potentially be used to secure funding.

**Resources Required to Implement Strategy:**

Voter/council approval; state grant funding to support green street elements in project design

**Timeline to Secure Resources for Optional Strategy:**

It is anticipated the project will be implemented in 3 years and completed 4 years if grant funding can be obtained. .

**3.2.4.2.3 Watershed Management Area Strategies**

Watershed Management Area Strategies to be implemented within the Carlsbad WMA are described in Section 2.4.4.

**3.2.5 Buena Vista Creek HA Monitoring and Assessment**

The RAs will conduct the following monitoring in the Buena Vista HA including the collective watershed-wide monitoring activities described in Section 2.6:

- Progress Toward Interim and Final Goals
- Dry Weather Special Study (as described in Section 2.6)
- MS4 Outfall Monitoring (as described in Section 2.6)
- JRMP Implementation (as described in Section 2.6)
- Regulations and Policy (as described in Section 2.6)

*Progress toward Interim and Final Goals*

While the Buena Vista HA does not have specified interim and final WQIP goals, there will be monitoring conducted within the HA to assess the overall receiving water health of the HA.

The Carlsbad WMA RAs will conduct receiving water monitoring at the mass loading station (BVC-MLS) as part of the long-term receiving water monitoring program. The BVC-MLS is at the downstream end of Buena Vista Creek, on the border Vista and Oceanside. The BVC-MLS will assist in providing data to assess program implementation in the Buena Vista HA.

In addition, the City of Vista will also conduct its own monitoring at BVC-MLS. To better understand Vista's flow and pollutant load contribution to Buena Vista Creek, continuous rainfall and flow monitoring has been conducted during the 2011-2012, 2012-2013, and 2013-2014 monitoring seasons. Additionally, two wet weather sampling events were conducted during the 2012-2013 monitoring season to estimate the annual wet weather water quality loads from Buena Vista Creek, where flow exits Vista and enters Oceanside. When feasible, the wet weather sampling coincided with the County of San Diego Copermittees' Regional Receiving Waters and Urban Runoff Monitoring Program at BVC-TWAS-1, which is located approximately 2.5 miles downstream of Vista's BVC-TIB station. The objective of this monitoring is to supplement existing monitoring data to better understand flow and pollutant loading to Buena Vista Creek from the City of Vista.

The City of Vista is proposing to augment the existing flow and water quality monitoring at the BVC-TIB station for a three-year period beginning in 2015-2016 monitoring season and extending through the 2017-2018 monitoring season. Pending storm event or other unforeseen constraints, two wet weather events will be monitored for the 2015-2016 season. Annual monitoring for the 2016-2017 and 2017-2018 seasons will include two dry weather and two wet weather monitoring events. Water quality analytes will include indicator bacteria, nutrients and sediment. Together with continuous flow data, water quality data will be used to estimate pollutant loads for wet weather annual load, dry weather annual load, and the total annual load of bacteria, nutrients and sediment from the City of Vista to the downstream portion of Buena Vista Creek. These data can assist the City in determining the existing conditions of Buena Vista Creek, and help guide the City's future WQIP strategies to mitigate pollutants discharging from the MS4 to Buena Vista Creek.



### 3.3 Agua Hedionda HA (904.3)

The Agua Hedionda HA is the third largest within the Carlsbad WMA. The HA, dominated by Agua Hedionda Creek, extends approximately 10.6 miles inland from the coast and is about 18,800 acres in area, comprising 14 percent of the WMA. Most of the HA is in the City of Carlsbad (41 percent); the remainder is in Vista (24 percent) and San Diego County (24 percent) and small amounts in Oceanside and San Marcos (Figure 27).

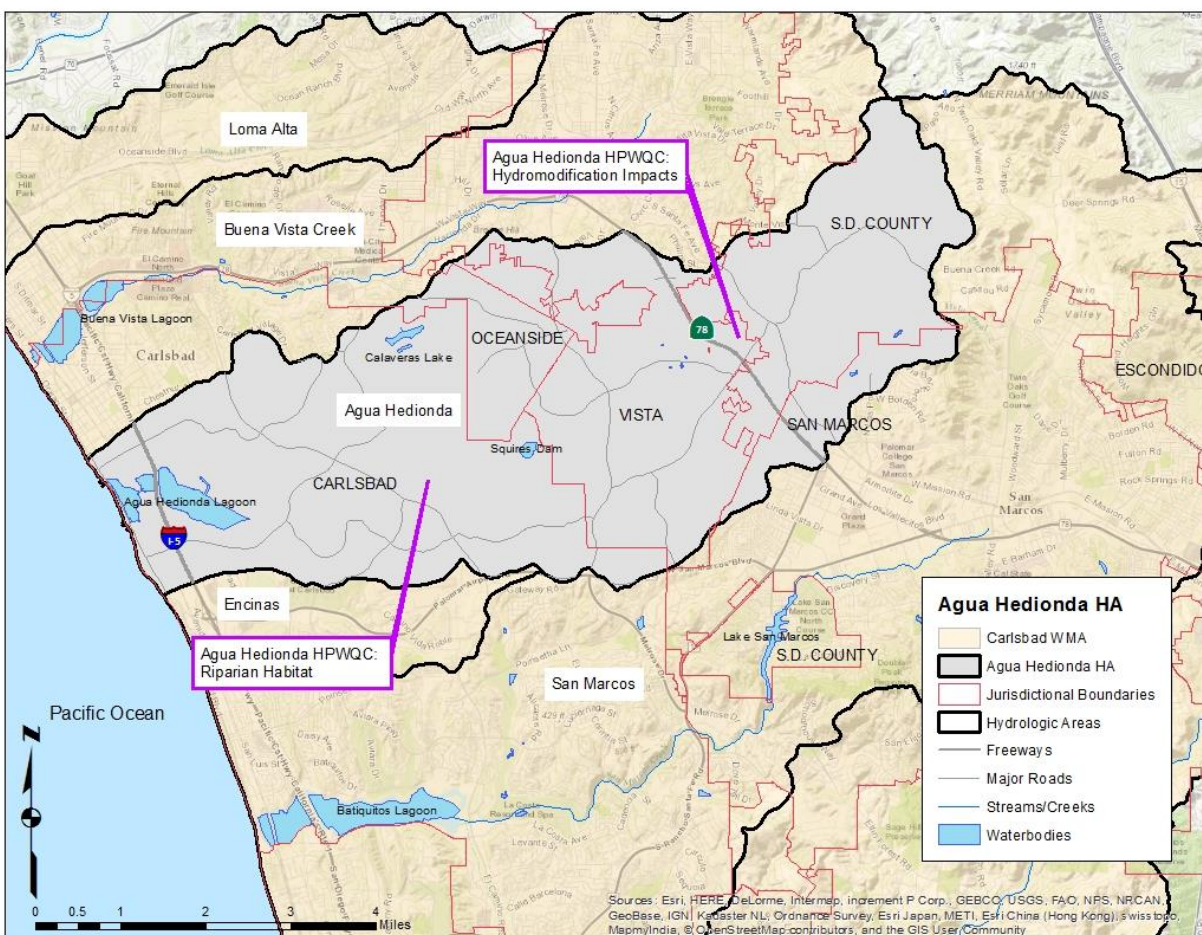


Figure 27: Agua Hedionda Hydrologic Area

The primary water bodies in the HA include Agua Hedionda Creek, Buena Creek, Letterbox Canyon, Agua Hedionda Lagoon and the Pacific Ocean.

Agua Hedionda Creek originates on the southwestern slopes of the San Marcos Mountains in west central San Diego County and discharges into the Pacific Ocean via Agua Hedionda Lagoon. The Agua Hedionda Lagoon is located within the City of Carlsbad, with 330 acres of the lagoon classified as wetland habitat. The lagoon receives freshwater primarily from Agua Hedionda Creek, but also from Buena Creek. The lagoon supports active recreational use, including: waterskiing; boating; paddle boarding; and jet skiing.

The Agua Hedionda Creek is on the 2010 303(d) listing for bacterial indicator, manganese, phosphorus, selenium, TDS, total nitrogen and toxicity. The Agua Hedionda Lagoon improved its conditions between



Agua Hedionda Lagoon: Recreational Use

the 2002 and the 2010 303(d) listings and is no longer impaired for indicator bacteria or sediment - there are currently no listings for impairment in Agua Hedionda Lagoon.

Over 70 percent of the watershed is developed (29 percent is open space or undeveloped) and is comprised of the following land uses: residential (33 percent), commercial (3 percent), roads and railway (11 percent), and other land uses (11 percent). All of these land uses are potential sources of pollutants and have potential impacts on the water quality discharged from the RAs' storm drain system. As development has occurred within this hydrologic area, two adverse impacts have occurred: fragmentation of habitat and accelerated hydromodification within the natural channels.

The hydrologic area is also home to two ecological reserves, the Carlsbad Highlands Ecological Reserve and the Agua Hedionda Lagoon Ecological Reserve. These two reserves are important components of the watershed that help protect the beneficial uses of the receiving waters.

The Carlsbad Highlands Ecological Reserve is a 473-acre property with highly valued habitat that include coastal sage scrub and grasslands. This habitat supports California gnatcatchers, sharp-shinned hawks, black-shouldered kites, turkey vultures and golden eagles.

The Agua Hedionda Lagoon Ecological Reserve is a 186-acre property that consists of a lagoon, salt marsh, and mudflat habitats. Many species of water-associated birds have been recorded in the area and the immediate environs. Mammals, amphibians and reptiles also use this parcel and its riparian and chaparral habitats.



Buena Vista Park: Riparian Habitat and Recreational Use

All of this watershed information provides context for the water quality conditions, priorities, pollutant sources, strategies, goals and schedules discussed in the next sections. Moreover, the intent of the upcoming sections is to describe how the RAs will effectively prohibit non-storm water discharges, reduce pollutants and storm water discharges from their storm drain systems, protect the beneficial uses of receiving waters from storm drain discharges, and/or achieve their goals.



### 3.3.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess the conditions of water quality in the Agua Hedionda HA, and to prioritize the identified water quality conditions. These efforts included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Facilitating workshops to receive input from the public and the watershed consultation panel
- Reviewing and analyzing the available data and information as summarized in Section 2.1 of this WQIP.

Based upon review and analysis of the gathered data and information, the following constituent groups were found to be of *low* priority for receiving waters within the Agua Hedionda HA:

- Oil & grease;
- Metals;
- Organics;
- Pesticides under dry conditions;
- Nutrients under wet conditions; and
- Sediment related impacts under dry conditions.

#### 3.3.1.1 Priority Water Quality Conditions

The RAs used the information gathered to assess the receiving water conditions (refer to Section 2.1, Table 3), and the impacts from MS4 sources (refer to Section 2.1, Table 4) to develop a “list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters” (Permit Provision B.2.c.).

The assessment of data and information for the Agua Hedionda HA identified riparian habitat, trash, indicator bacteria, toxicity, nutrients, and hydromodification impacts in Agua Hedionda Creek, and nitrate and nitrite in Buena Creek as PWQCs in the Agua Hedionda HA (Table 30).

**Table 30: Agua Hedionda HA Priority Water Quality Conditions**

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody
All water bodies within the Carlsbad WMA	All	All	Trash	All	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>2</sup>
All water bodies within the Carlsbad WMA	All	All	Riparian Habitat	WARM;REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>2</sup>
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Indicator Bacteria	REC-1	Dry and Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Toxicity	WARM	Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Nutrients Category <sup>1</sup>	WARM	Dry and Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County
Agua Hedionda Creek	Agua Hedionda Hydrologic Area	904.30	Sediment - Erosion – Hydromodification	-	Wet Weather	Carlsbad, Oceanside, San Marcos, Vista, San Diego County
Buena Creek	Agua Hedionda Hydrologic Area	904.30	Nitrate and Nitrite	Municipal & Domestic Water Supply (MUN)	Dry Weather	Vista, San Diego County

<sup>1</sup> Based on 2011 LTEA, nutrients category includes at least two or more of the following pollutants: Dissolved Phosphorous; Orthophosphate; Total Phosphorous; Total Kjeldahl Nitrogen; Total Nitrogen; Eutrophication; or Benthic Algae

<sup>2</sup>This is a watershed-wide PWQC and all jurisdictions are listed. However, only the Cities of Carlsbad, Oceanside, San Marcos, and Vista and County of San Diego are located within the Agua Hedionda HA.

### 3.3.1.2 Highest Priority Water Quality Conditions

Once the PWQCs were identified, the next step was to “identify the highest priority water quality conditions to be addressed by the WQIP and provide the rationale for selecting a subset of the [priority] water quality conditions identified”. The RAs established the process outlined in Section 2.1 to identify the HPWQCs within the Carlsbad WMA. Figure 7 provides an illustration of the process. Although a subset of priority water quality conditions is identified as the highest priority condition(s), other priority water quality conditions are expected to be positively impacted through strategies identified for implementation by the RAs (LTEA, 2011 and CASQA). Table 33 identifies the multi-pollutant benefits of the strategies to be implemented within the HA.

Table 31 lists the two HPWQCs for the Agua Hedionda HA that were identified using the process outlined in Section 2.2. The rationale for selecting these two HPWQCs was based on Step 3 of Figure 7. The two HPWQCs include riparian habitat and hydromodification impacts at Agua Hedionda Creek. More information on the rationale for HPWQCs identification is described below.



Agua Hedionda Creek: Hydromodification Impacts

During the RAs evaluation of all available data the Agua Hedionda Watershed Management Plan (WMP), completed in August 2008, was reviewed. The Agua Hedionda WMP was developed through a SWRCB grant provided to the City of Vista, in cooperation with the Carlsbad Watershed Network, to “provide a comprehensive plan to restore watershed functions and minimize future degradation”. While this plan was not focused exclusively on water quality improvement, the Agua Hedionda WMP identified goals and provided recommendations for management actions to address the priority issues in the watershed. In particular, it identified preservation, riparian buffer, stream restoration, and wetlands restoration as recommended management actions.

Restoration of riparian habitats can improve water quality by allowing filtration of pollutants and reducing sedimentation through riverbank stabilization. The role of riparian areas in water quality improvement includes processing, removing, transforming, and storing such pollutants as sediment, nitrogen, phosphorous, and certain heavy metals (Washington State Department of Ecology, 1996). Improving riparian habitat in Agua Hedionda HA has been identified as the HPWQC based on public input (including the WMPs), the Stormwater Monitoring Coalition (SMC) Stream Survey, the multiple water quality benefits that can be achieved, and the ability to increase the assimilative capacity of the receiving waters. The City of Carlsbad will address riparian habitat through the restoration of wetland and upland habitat

in a stretch of Agua Hedionda Creek. This restored habitat will be incorporated in to the City’s Habitat Management Plan for long term preservation and management.

Hydromodification impacts can also contribute to the degradation of riparian habitat and water quality. The Agua Hedionda WMP indicated that “mature trees along streambanks are threatened by undercutting; some mature riparian trees have already been lost, and additional losses are likely to occur if current hydromodification and channel stability trends continue”. In addition, Goal #3 of the Agua Hedionda WMP is to restore watershed functions, including hydrology, water quality, and habitat using a balanced approach that minimizes negative impacts. Through the analysis of available data and information, including the Agua Hedionda WMP, and identification of TSS and turbidity in the LTEA, the City of Vista has identified hydromodification impacts as the HPWQC for their jurisdiction. The Agua Hedionda WMP specifically identified Roman Creek, a tributary to Agua Hedionda Creek, as having medium wetland restoration opportunities. The City of Vista will address hydromodification impacts through the expansion of the wetlands in the upper portion of the watershed along Roman Creek. The expansion of wetlands will improve biochemical and hydrologic elements that will improve habitat function and diversity, and will lower the peak discharge from storm events. Lowering the peak discharge will also benefit the stabilization of downstream reaches of the watershed, specifically where the City of Carlsbad will be improving riparian habitat.

**Table 31: Agua Hedionda HA Highest Priority Water Quality Condition**

Hydrologic Area	Applicable Receiving Water*	Highest Priority Water Quality Condition (Condition, Pollutant, or Stressor)	Temporal Extent
Agua Hedionda	Agua Hedionda Creek	Riparian Habitat Degradation	Dry and Wet Weather
Agua Hedionda	Agua Hedionda Creek	Hydromodification Impacts	Dry and Wet Weather

### 3.3.2 Agua Hedionda HA Sources

As described in the Agua Hedionda WMP, the two primary sources causing and contributing to riparian habitat health and hydromodification issues are land use and impervious surfaces. Urbanized areas with impervious surfaces are a known source that can increase the variety and amount of pollutants that have the potential to enter the MS4 and receiving waters. Impervious surfaces do not allow storm water to infiltrate into the ground, which can greatly increase the volume and velocity of storm water runoff causing hydromodification and habitat degradation impacts. Figure 28 presents the land uses within the Agua Hedionda HA.

The RAs within Agua Hedionda have identified and targeted land uses and areas that are suspected of causing and contributing to riparian habitat degradation and/or hydromodification issues within the HA. These areas and land uses are described in more detail in strategies included in Section 3.3.4.1.



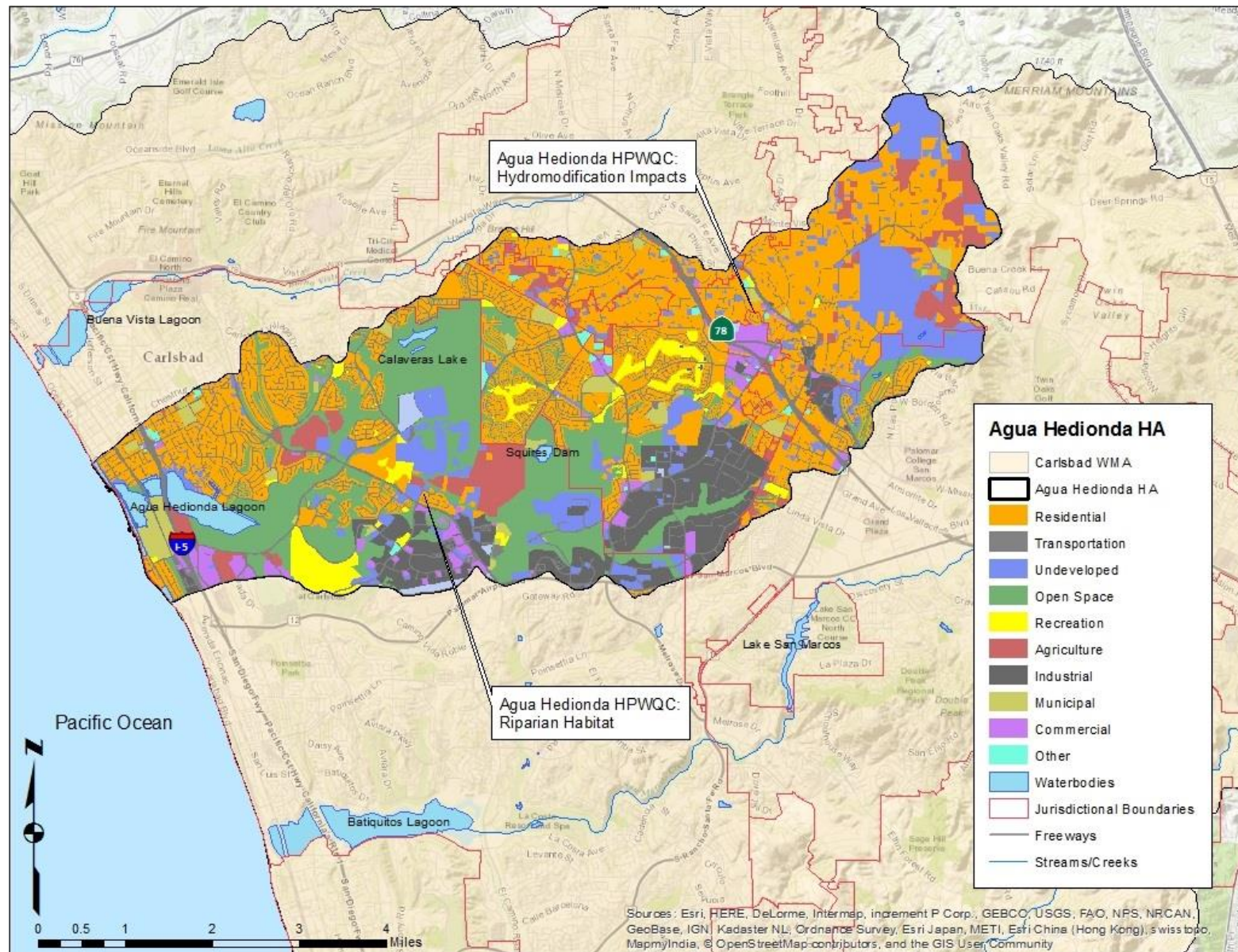


Figure 28: Agua Hedionda Hydrologic Area Land Uses



### 3.3.3 Agua Hedionda HA Goals and Schedules

Identifying goals and the means to achieve them is a fundamental component of the Carlsbad WMA WQIP. Goals define realistic water quality improvement outcomes and provide direction and purpose to program planning. Interim and final numeric goals were identified as benchmarks for program performance and assessing progress through a measureable and quantifiable mechanism. The interim and final goals for the Agua Hedionda HA are provided below. Figure 29 identifies the location for the City of Carlsbad’s restoration project and Figure 30 identifies the location of the City of Vista’s wetland creation project.

**Table 32: Interim and Final Goals for Agua Hedionda HA**

Hydrologic Area: Agua Hedionda			
High Priority Water Quality Condition: Riparian Habitat Degradation		Applicable Receiving Water(s): Agua Hedionda Creek	
Pollutant/Stressor: Various		Responsible Agencies: City of Carlsbad	
Interim Goal <sup>1</sup> (2013-2018) 2018	Interim Goal <sup>1</sup> (2018-2023) 2023	Final Goal <sup>1</sup> (2023-2028) 2028	
Tributary Creek Interim Goal: Remove invasive species and restore wetland habitat in approximately 3.6 acres in and adjacent to a tributary of Agua Hedionda Creek	Agua Hedionda Creek Interim Goal: 50% of Agua Hedionda Creek Restoration project schedule complete	Completion of Agua Hedionda Creek Restoration project (8.81 acres of mitigated riparian and upland habitat) and long term preservation through the City of Carlsbad’s Habitat Management Plan	
Hydrologic Area : Agua Hedionda			
High Priority Water Quality Condition: Hydromodification Impacts		Applicable Receiving Water(s): Agua Hedionda Creek	
Pollutant/Stressor: Various		Responsible Agencies: City of Vista	
Interim Goal <sup>1</sup> (2013-2018) 2018	Interim Goal <sup>1</sup> (2018-2020) 2020	Interim Goal <sup>1</sup> (2020-2023) 2023	Final Goal <sup>1</sup> (2023-2026) 2026
3% of wetland creation completed adjacent to 700 feet of Roman Creek, which is tributary to Agua Hedionda Creek.	10% of wetland creation completed adjacent to 700 feet of Roman Creek	50% of wetland creation completed adjacent to 700 feet of Roman Creek	Completion/creation of an approximate 2-acre wetlands adjacent to Roman Creek in the City of Vista’s Buena Vista Park area.

<sup>1</sup>This is the projected timeline, but implementation dates may change depending on environmental permitting. The schedule will be updated as applicable in WQIP Annual Reports or Updates.

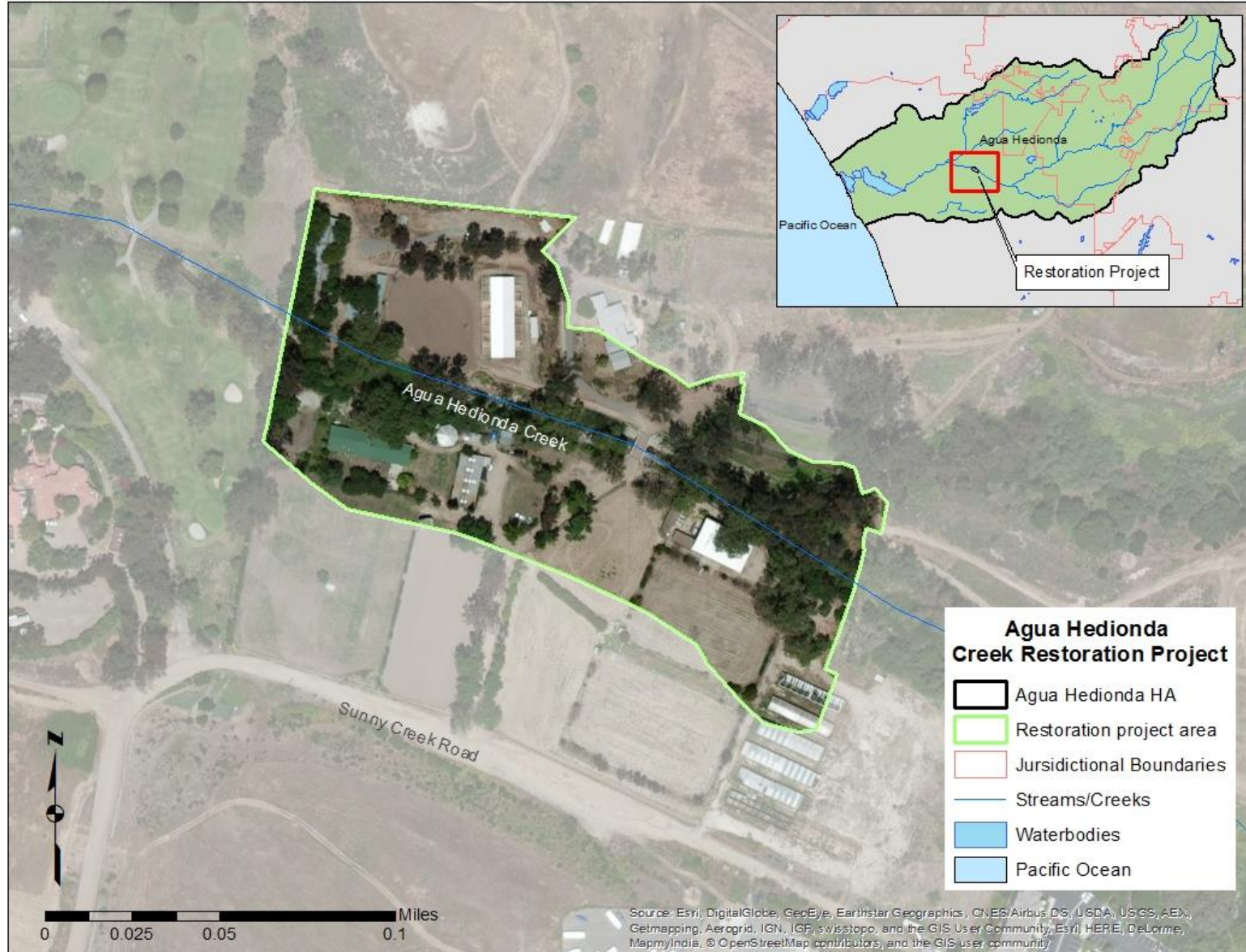


Figure 29: City of Carlsbad's Agua Hedionda Creek Restoration Project Location



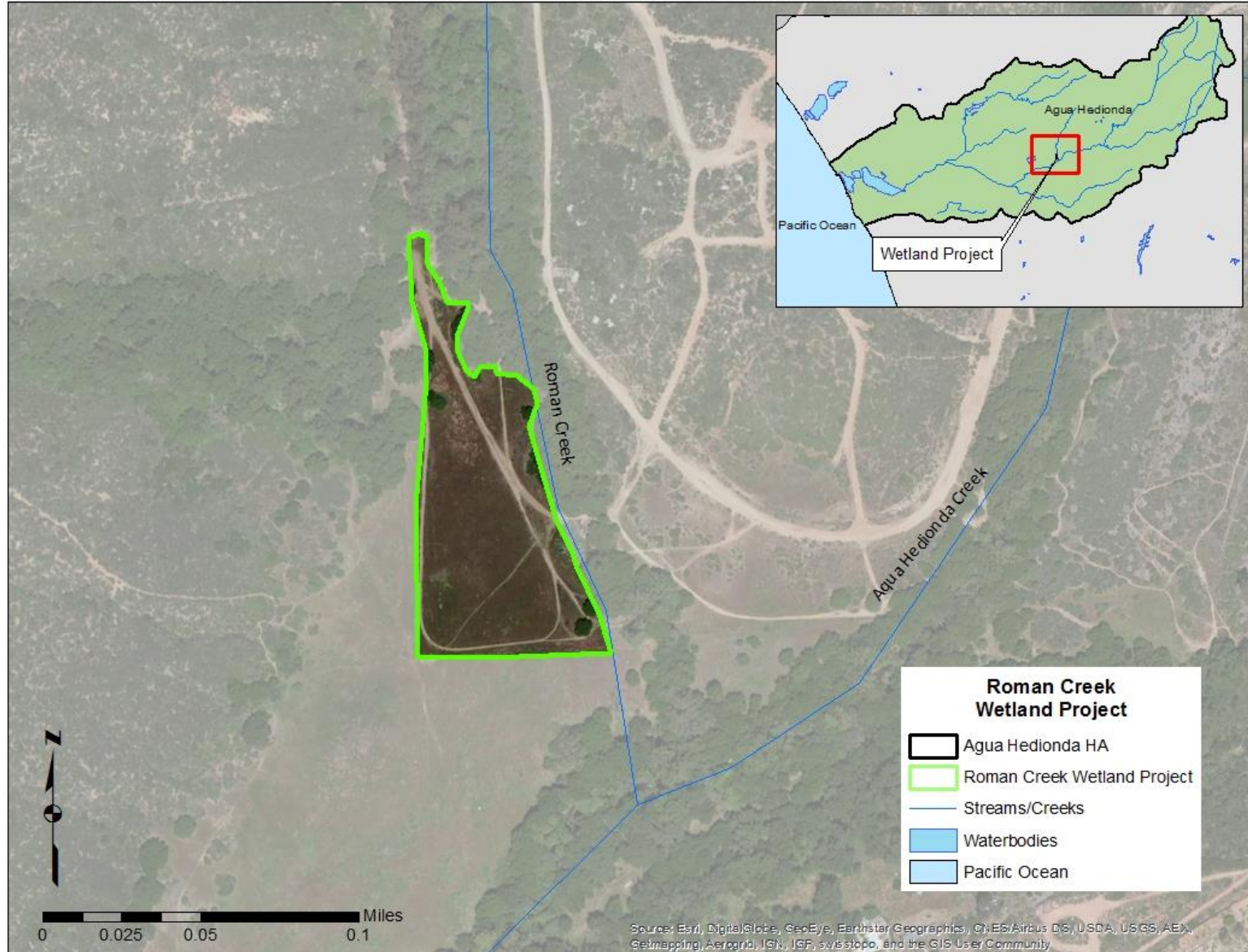


Figure 30: City of Vista's Roman Creek Wetland Project Location

### 3.3.4 Agua Hedionda HA Strategies

Based on the process and information identified in Section 2.4, the RAs within the Agua Hedionda HA identified the strategies to be implemented, or triggered for implementation, to address the HPWQC and PWQCs to the MEP. In addition to the focus placed on the HPWQC, the RAs' strategies will be implemented within the respective RA's jurisdiction to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, and protect the beneficial uses of the receiving waters from MS4 discharges in order to achieve or maintain the interim and final numeric goals. Furthermore, in some cases, strategies include those that improve or enhance the natural beneficial watershed features: wetlands; riparian habitat; upland vegetation; and connectivity.

Table 33 identifies the Water Quality Improvement Strategies to be implemented throughout the entire Agua Hedionda HA. The Agua Hedionda HA HPWQCs are highlighted in yellow and the PWQCs are highlighted in green in the table, and the strategies targeting those conditions are also identified. The table includes planned strategies to be implemented as part of the Copermittees' core programs and additional, "optional" strategies that Copermittees will implement to target the HPWQC or PWQCs.<sup>16</sup> In many cases, RAs enhanced their jurisdictional strategies to target specific areas or sources that are causing or contributing to the HPWQC or PWQCs in the Agua Hedionda HA. HA-specific geographic characterizations and prioritization is described in Section 3.3.4.1 and are noted in Table 33, where applicable. Additional optional strategies are also identified in Table 33. The additional optional strategies may be implemented based on a variety of triggers, such as progress made towards numeric goals. Strategies numbered 1-13 in Table 33 are described in Section 2.4 and further detailed in each RAs JRMP. All other strategies are described in the subsections below.

As the RAs implement strategies and analyze data, it is expected that these strategies and schedules may change through an iterative and adaptive management process. The adaptive management process is presented in Section 2.5.

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<sup>16</sup> Core programs address the requirements of Permit Provisions E.2 through E.7, and their inclusion in the Water Quality Improvement Plan is discussed in Permit Section B.3.b.(1)(a). The requirements applicable to additional, "optional" strategies are discussed in Permit Provision B.3.b.(1)(b).

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Table 33: Aqua Hedionda HA Strategies

Water Quality Improvement Plan Strategies			Jurisdiction/Area					Target Sources							Target Pollutant, Stressor, or Condition										Target Temporal Benefit		Implementation Schedule									
			City of San Marcos	City of Vista	City of Carlsbad	County of San Diego	City of Oceanside	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Hydromodification Impacts	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b)))																																				
1	Administrative BMPs	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
2	Investigations	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
3	Development and Redevelopment Requirements	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide						•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
4	Construction Site Inspections	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide				•					•	•					•	•	•		•	•	•	•	•	•	•	•	•	•	•	
5	Existing Development Facilities, Areas and Activities Inspections	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•		•			•		•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•
6	MS4 Inspections/Cleaning	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide								•	•	•		•	•				•		•	•	•	•	•	•	•	•	•	•	•	•
7	Street Sweeping	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide							•		•	•	•	•	•	•			•		•	•	•	•	•	•	•	•	•	•	•	•
8	General Education and Outreach	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9	Employee Training <sup>2</sup> /Focused Training	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•						•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•
10	Enforcement	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•
11	Partnership Program(s)	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
12	Program for Retrofitting Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
13	Program for Stream, Channel and/or Habitat Restoration in Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
14	Irrigation Runoff Reduction Program	-	AH-04 Basin	-	-	-	•	•		•	•	•	•	•	•		•	•	•	•	•	•	•	•		•				•	•	•	•	•	•	
15	Property-Based Inspections/Patrol	-	AH-04 Basin	HA Wide	-	-	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•
16	Targeted Street Sweeping	-	-	CB-PA2	-	-	•	•		•	•		•		•	•	•	•	•	•			•	•	•					•	•	•	•	•	•	•
17	Provide Maximum Response Time for Complaints Received via Storm Water Hotline	-	-	HA Wide	-	-	•	•	•	•	•		•		•	•	•	•	•	•			•	•	•					•	•	•	•	•	•	•
18	Enhanced Education Program	-	AH04 Basin-	CB-PA2	-	-	•	•		•	•				•	•	•	•	•	•	•	•	•	•	•					•	•	•	•	•	•	•
19	Implement Program Efficiencies	-	-	CB-PA2	-	-	•	•	•	•				•	•	•	•	•	•	•			•	•	•	•				•	•	•	•	•	•	•

Table 33: Aqua Hedionda HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Condition								Target Temporal Benefit		Implementation Schedule									
		City of San Marcos	City of Vista	City of Carlsbad	County of San Diego	City of Oceanside	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Hydromodification Impacts	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)
20	Homeowners Association and Property Manager Outreach Program	-	AH04 Basin-	-	-	-				•	•			•	•		•	•				•	•	•	•				•	•	•	•	•	
21	Agua Hedionda Creek Restoration Project			HA-Wide			•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•						•	•	•	
22	Roman Creek Wetland Project		HA-Wide				•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•				•	•	•	•	•
ADDITIONAL OPTIONAL STRATEGIES (PERMIT SECTION B.3.b. (1) (b)) (more information on these strategies and criteria for initiating them can be found in Section 3.3.5.2.2)																																		
23	Implement Structural or Retrofit Existing BMPs	HA Wide	AH-04 Basin	HA Wide	-	-	•	•	•	•		•			•	•	•	•	•	•	•	•	•	•	•		Based on appropriate criteria for initiating (See Section 3.3.5.2.2 for information)							
24	Implement Offsite Alternative Compliance Program	HA Wide		HA Wide	HA Wide	-		•	•			•			•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.3.5.2.2 for information)							
WATERSHED MANAGEMENT AREA STRATEGIES (PERMIT SECTION B.3.b. (2))																																		
25	Integrated Regional Watershed Management(IRWM)	WMA wide	WMA wide	WMA wide	WMA wide	WMA wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating							
26	Sustainable Landscape Incentive Program	WMA wide	WMA wide	WMA wide	WMA wide	WMA wide	•	•		•					•			•	•			•	•	•	•		Based on appropriate criteria for initiating							

1 Optional Strategies. Note that where optional strategies are listed under the Planned Jurisdictional Strategies category, RAs have committed to implementing them, so no additional detail on circumstances that would trigger those optional strategies is necessary.

### 3.3.4.1 Geographic Characteristics and Prioritization

Concentrating program efforts in specific geographic areas to address known or suspected sources of discharges and pollutants is expected to improve the effectiveness of the strategies and activities.

Based on the RA's review of the characteristics of the Agua Hedionda HA, several focus areas were selected for concentrated program efforts. Focus areas were selected based on identified sources that are associated with contributing to the HPWQC, outfall information collected by RAs and other identified characteristics that support the areas as priority areas. These focus areas include the AH04 Basin and SM-AH Basin. The strategies for these focus areas are summarized in the subsections below.

#### 3.3.4.1.1 City of Vista –Agua Hedionda 04 (AH04) Basin Focus Area

The Agua Hedionda 04 (AH04) Basin is a large sub-basin located mid-watershed in the Agua Hedionda HA and discharges through a tributary channel approximately 2,000 feet upstream of Agua Hedionda Creek. The City of Vista identified the AH04 Basin as a focus area to concentrate strategy implementation. This focus area is completely within the City of Vista's jurisdictional boundaries and has a mixture of single-family residential, commercial and multi-family land uses. Land uses include homes, commercial buildings, apartment complexes, common areas, a high school and recreational park areas and a golf course that include landscaping and turf. The focus area was selected due to the diverse land uses, amount of impervious surfaces, and the relatively few structural BMPs (treatment or flow control facilities) within the area because the majority of this basin was developed prior to implementation of the City's SUSMP. The AH04 Basin is shown in Figure 31.

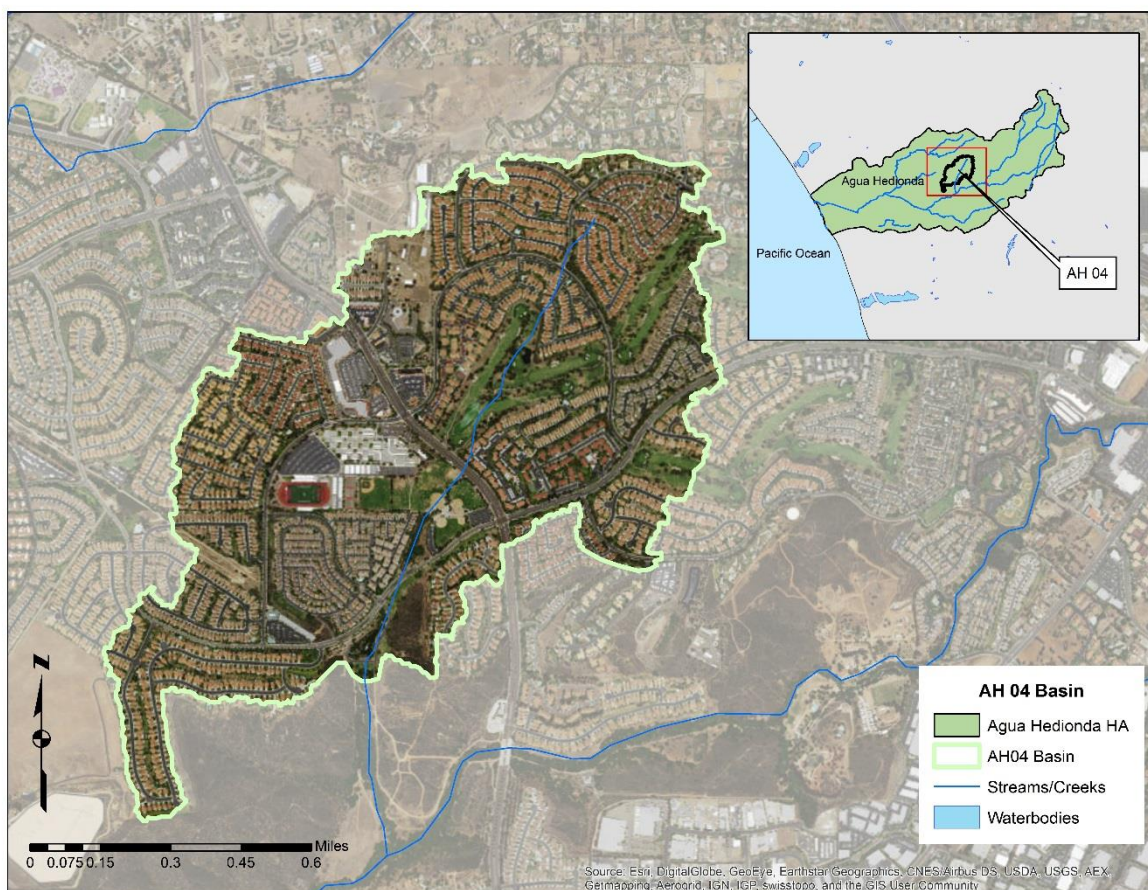


Figure 31: AH04 Basin Focus Area



### 3.3.4.1.2 CB-PA2 Focus Area

The CB-PA2 focus area is split into two drainage areas located south of Carlsbad Village Drive and CB-PA1, see Figure 32. The northern portion of the focus area drains to the north towards Buena Vista Lagoon. The southern portion drains south towards Agua Hedionda Lagoon. This area is a mixture of single family residential, commercial and multi-family land uses and includes homes, commercial buildings, apartment complexes, common areas, a school and recreational park areas that include landscaping and turf, which are known types of contributors to riparian habitat degradation.



Figure 32: CB-PA2 Focus Area

### 3.3.4.2 Agua Hedionda HA Strategy Descriptions

The following sections describe the planned jurisdictional and planned optional strategies, additional optional strategies, and watershed management area strategies to be implemented within the Agua Hedionda HA.

#### 3.3.4.2.1 Planned Jurisdictional and Optional Strategies

The planned jurisdictional and planned optional strategies to be implemented within the Agua Hedionda HA are described below. These strategies include the core jurisdictional program elements (Permit Provisions, E.2. through E.7.)<sup>17</sup> described in Section 2.4.2 of this WQIP, enhancements of the core jurisdictional program elements, and optional strategies that are planned for implementation. Optional strategies that are already planned for implementation do not include additional detail on circumstances that would trigger implementation or funding and resources.

<sup>17</sup> Core jurisdictional program elements (Strategies 1-13 in Table 10) are described in Section 2.4.2 of this WQIP and are not summarized in this section.

### Strategy 14 (Table 33) - Irrigation Runoff Reduction Program

**Jurisdiction/Area for Implementation:** City of Vista: AH-04 Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Hydromodification Impacts; Sediment; Pesticides</i>	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

The objective of the Irrigation Runoff Reduction Program (IRRP) is to eliminate or reduce dry weather flow contributions, concurrent with the final goals, coming from irrigation runoff, regardless of the time of day the discharges occur. Reducing or eliminating runoff from irrigation will reduce non-storm water flows, thereby reducing sediment and bacterial contributions (as well as other pollutants) in both dry weather and wet weather scenarios. In addition to sediment and bacteria, an irrigation runoff program is expected to target such pollutants as heavy metals, nutrients, oil and grease, and pesticides. Core elements include:

- Developing municipal codes that prohibit irrigation runoff
- Developing educational materials and outreach program specific towards irrigation runoff
- Assessing dry weather flows at outfall(s)
- Identifying key times to perform site observations
- Perform site observations to identify sources of irrigation runoff
- Collaboration with the City of Carlsbad Public Works Department to address municipal property irrigation systems
- Initiating contact and correspondence with property managers/owners
- Periodically assessing flows
- Optionally developing and implementing an incentive program to encourage the elimination of irrigation runoff

### Strategy 15 (Table 33) - Property-Based Inspections/Patrol

**Jurisdiction/Area for Implementation:** City of Carlsbad: HA Wide; City of Vista: AH-04 Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

The objective of this program is to reduce discharges to the MS4 and provide inspection of existing development in a more cost efficient and effective manner. The inspections are expected to result in the elimination of dry weather flows, but will also affect the wet weather loading potential and provide opportunities for identification of potential retrofit projects. Features include:

- Developing patrol and inspection protocols
- Developing and conducting staff training
- Conducting property-based/patrol inspections
  - Performing patrols/inspections a minimum of twice per year in this focus area
  - Performing onsite patrols/inspections of each property in the focus area
  - Identification of active dry weather discharges and evidence of historical discharges
  - Identification of pollutant generating activities and areas that may contribute wet weather storm water pollutant loading
- Performing follow-up with property owner/manager on identified issues to resolve discharges and/or potential pollutant discharges.



The cities of Carlsbad and Vista will perform these property-based/patrol inspections multiple times per year at various times of the day to capture irrigation runoff and other non-authorized discharges as well as identify BMP issues.

Property-based inspections/patrols of *each* property in the City of Carlsbad's jurisdiction will be performed at least once annually.

### Strategy 16 (Table 33) - Targeted Street Sweeping

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA2

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public; Roads, Streets, Highways and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Toxicity; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Targeted street sweeping in the focus area will be a minimum frequency of every two weeks.

### Strategy 17 (Table 33) - Provide Maximum Response Time for Complaints Received via Storm Water Hotline

**Jurisdiction/Area for Implementation:** City of Carlsbad: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; General Public; Roads, Streets, Highways and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Maintain a maximum response time for complaints received via Storm Water Hotline, or other mechanism. Carlsbad will have an Environmental Specialist respond and arrive on-site *within* 45 minutes of notification to eliminate any unauthorized discharge, identify the responsible party and minimize impacts to receiving waters. This response time is expected to eliminate discharges while they are occurring and provide an opportunity to immediately educate or enforce as necessary.

### Strategy 18 (Table 33) - Enhanced Education Program

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA2; SM-AH; City of Vista: AH-04 Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Hydromodification Impacts; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Priority pollutant specific education and outreach program to be conducted in the AH04 focus area for residents and commercial facilities related to sediment, bacteria and other priority pollutants. The materials will focus on results obtained through property-based inspections and address priority pollutant sources.

- Identification of pollutant-generating activities and areas that may contribute wet weather storm water pollutant loading (e.g., concentrated pet waste in common areas)

Performing follow-up with property owner/manager on identified issues to resolve discharges and/or potential pollutant discharges

### Strategy 19 (Table 33) - Implement Program Efficiencies

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA2

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City is implementing a new computer database which will allow for use with mobile devices which will increase the City's response time to IDDE reports, discoveries, complaints and monitoring investigations. This new computer database will also streamline inspections and allow for review of previous information while in the field. It is also anticipated to speed the enforcement process as well expedite the capture of data for field follow-up. These increases in the speed at which data is collected and assimilated will improve the efficiencies of the City's storm water program.

### Strategy 20 (Table 33) - Home Owners Association (HOA) and Property Manger Outreach Program

**Jurisdiction/Area for Implementation:** City of Vista: AH-04 Basin

<b>Target Sources:</b> Residential; General Public; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Nutrients; Sediment; Pesticides</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of Vista will implement an education and outreach program that encourages and/or incentivizes HOAs and business property managers to implement measures to reduce dry weather and/or wet weather flows leaving their properties. Practices could include proper installation and maintenance of irrigation systems, conversion to drought-tolerant landscaping, downspout disconnection, etc.

### Strategy 21 (Table 33) – Agua Hedionda Creek Restoration Project

**Jurisdiction/Area for Implementation:** City of Carlsbad

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Hydromodification Impacts; Sediment; Pesticides</i>	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The Agua Hedionda Creek Restoration Project consists of the construction of a regional flood control detention basin, and creation of wetland habitat with upland habitat buffers. The project is located within the northeast quadrant of the City of Carlsbad along Agua Hedionda Creek. The project will include approximately 2.43 acres of wetland area and 5.5 acres of upland habitat. The goals of the project are to enhance existing wetland habitat, and re-establish wetland and upland habitat. The project is expected to improve and increase the receiving water's functions and services (water filtration, sensitive wildlife and plant habitat, etc.). Once completed, the restored area will be included in the City of Carlsbad's Habitat Management Plan for long-term maintenance and monitoring.

**Strategy 22 (Table 33) – Roman Creek Wetland Project**

<b>Jurisdiction/Area for Implementation:</b> City of Carlsbad		
<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Residential; General Public; Land Development & Redevelopment; Roads, Streets, Highways and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Hydromodification Impacts; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

The wetland project is located along Roman Creek, a tributary to Agua Hedionda Creek, in the southern portion of the City of Vista. The area directly adjacent to Roman Creek will be the location for wetland creation as well as wetland enhancement opportunities. The site is identified in the Agua Hedionda WMP as having medium wetland restoration opportunities (Tetra Tech 2008). The wetland opportunities ranking in the WMP, combined with the site's present ownership (City of Vista-owned parcels), contribution towards enhancement of the Agua Hedionda Creek corridor, and public support for the creek restoration were the primary reasons for site selection.

The wetland project will create and enhance wetlands along Roman Creek by implementing the following strategies:

1. Obtaining permits from key environmental resource agencies (e.g., Fish and Wildlife, Army Corps of Engineers, San Diego Regional Water Quality Control Board) (2016-2018);
2. Removing invasive non-native floral species from jurisdictional areas and revegetating with native wetland species (2018-2026);
3. Constructing the wetlands adjacent to 700 feet of Roman Creek (2018-2026);

**3.3.4.2.2 Agua Hedionda Optional Strategies**

This section describes the additional optional strategies that will be triggered for implementation in response to specific conditions that are described in accordance with the requirements of Permit Provision B.3.b(1)(b).

**Strategy 23 (Table 33) - Implement Structural or Retrofit Existing BMPs**

<b>Jurisdiction/Area for Implementation:</b> City of Carlsbad: CB-PA2; City of San Marcos: HA Wide; City of Vista: AH-04 Basin		
<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; Land Development & Redevelopment	<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; Land Development & Redevelopment	<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities/Owners; Construction Sites and Personnel; Residential; Land Development & Redevelopment

**Strategy Description:**

Implement structural (engineered) BMPs or retrofitting existing structural BMPs to address flow and/or pollutant issues

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the Cities to implement.

**Resources Required to Implement Strategy:**

Voter/council approval of projects; staffing necessary to implement the planning, design and construction of such projects; project funding; required permits from state and federal regulatory agencies.

**Timeline to Secure Resources for Optional Strategy:**

If implemented, structural BMPs will be integrated into the City's Capital Improvement Program for planning, design and construction. Many of the City's typical capital projects are funded through dedicated sources, e.g., transportation tax dollars. Structural BMPs will have to identify alternative sources of funding, e.g., grants or partnerships, and therefore may take longer to process than typical capital projects. It is estimated that structural BMP projects may take five years to secure the resources necessary to initiate each project within the strategy.

### Strategy 24, (Table 33) - Implement Offsite Alternative Compliance Program

**Jurisdiction/Area for Implementation:** City of Carlsbad: CB-PA2; San Marcos and County of San Diego Jurisdiction within Agua Hedionda HA

<b>Target Sources:</b> Industrial and Commercial Facilities/Owner; Construction Sites and Personnel; Residential; Land Development & Redevelopment	<b>Target Sources:</b> Industrial and Commercial Facilities/Owner; Construction Sites and Personnel; Residential; Land Development & Redevelopment	<b>Target Sources:</b> Industrial and Commercial Facilities/Owner; Construction Sites and Personnel; Residential; Land Development & Redevelopment
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#### Strategy Description:

The County is currently implementing Phase 1 of the Offsite Alternative Compliance Program as defined in the WPO, Section 67.811(b)(4)(c). This phase allows for an Applicant-Implemented Offsite Alternative Compliance Project (ACP) project. This program became effective on February 26, 2016 and allows for a developer to wholly or partially satisfy their on-site storm water compliance obligations through the implementation of an ACP that is owned or constructed by the PDP project applicant. The cities will develop an alternative compliance program utilizing the guidelines established in the accepted Water Quality Equivalency Guidance for Region 9 and will incorporate potential candidate project areas identified in the Watershed Management Area Analysis. The cities are also exploring the development of a possible In-Lieu Fee program.

#### Circumstances to Trigger the Implementation of the Strategy:

The following all will need to be satisfied to trigger the strategy:

1)The Copermittees finalize water quality equivalency standards for riparian habitat and submit it to the RWQCB for approval, 2) the RWQCB approves the water quality equivalency standards, 3) an acceptable framework for allocating credits for offsite BMPs is developed by the Copermittees and approved by the City, 4) the program does not require the City to take on unfunded long-term maintenance responsibility for BMPs used as a means of compliance by private projects, and 5) adequate staffing resources have been obtained.

#### Resources Required to Implement Strategy:

Staffing resources are needed to develop and administer the program. The level of staff administration needed will depend on the number of projects that propose to comply via offsite alternative compliance and the complexity of tracking offsite BMP maintenance. Staffing resources are estimated at 0.5 to 1.0 FTE to develop the program initially and 0.5 FTE to administer the program on an ongoing basis.

#### Timeline to Secure Resources for Optional Strategy:

Following the finalization of water quality equivalency and crediting systems on a regional basis, it is anticipated that another one to three years would be needed to develop and implement the program.

#### 3.3.4.2.3 Watershed Management Area Strategies

Watershed Management Area Strategies to be implemented within the Carlsbad WMA are described in Section 2.4.4.

#### 3.3.5 Agua Hedionda HA Monitoring and Assessment

The RAs will conduct the following monitoring in the Agua Hedionda HA including the collective watershed-wide monitoring activities described in Section 2.6:

- Progress Toward Interim and Final Goals
- Dry Weather Special Study
- MS4 Outfall Monitoring (as described in Section 2.6)
- JRMP Implementation (as described in Section 2.6)
- Regulations and Policy (as described in Section 2.6)

#### Progress toward Interim and Final Goals

The progress toward meeting the interim and final goals will be monitored and assessed through the restoration project's implementation and milestones. There will be water quality monitoring that is associated with the restoration projects which is summarized below.

#### Hydromodification Impacts - Monitoring Plan Summary for Roman Creek Wetland Project

Once the Roman Creek Wetland Project is completed, the five-year monitoring plan will include both qualitative and quantitative surveys. The qualitative surveys will ensure that the proper maintenance and establishment procedures are followed. The quantitative surveys will measure the establishment of the

site to determine its compliance with the success milestones, e.g., vegetative cover establishment. Consisting of a general site walkover and habitat characterization, qualitative surveys will be conducted during each monitoring visit. For the quantitative surveys, the California Rapid Assessment Method (CRAM) will be employed. CRAM is a part of a comprehensive program plan to monitor the health of wetlands and riparian habitats throughout California and includes three assessment levels: Level 1) a general landscape assessment, including remote sensing and minimal field surveys (e.g., California Wetland Inventory); Level 2) rapid assessment methods using visible field diagnostics and existing data to assess conditions at wetland and riparian sites; and Level 3) intensive site assessment to provide quantitative field data to calibrate and validate Levels 1 and 2 methods, and to test hypotheses about the causes of habitat conditions.

**Riparian Habitat Degradation – Monitoring Plan Information for Agua Hedionda Creek Restoration Project**

There is currently no monitoring plan developed for the Agua Hedionda Creek Restoration Project. The monitoring that will be required through permitting will be provided in future WQIP Annual Reports or Updates.

***Agua Hedionda HA Special Study***

A Dry Weather Special Study will be implemented to characterize temporal flow and applicable pollutant patterns at selected persistently flowing major MS4 outfalls during summer dry weather conditions. The special study is related to non-stormwater flows and associated pollutants, which can contribute to the identified HPWQC and will be implemented in priority areas within respective jurisdictions.

The Dry Weather Special Study will address the following questions:

- What is the baseline flow at the specified major MS4 outfalls during summer dry weather conditions?
- What are the temporal flow patterns at specified major MS4 outfalls during summer dry weather conditions?
- Are summer dry weather flows at the specified major MS4 outfalls contributing applicable pollutants to the receiving water(s)?
- What are the temporal patterns of applicable pollutant concentrations at specified major MS4 outfalls?

The study will:

- Address data gaps related to temporal flow and applicable pollutant patterns at identified persistently flowing major MS4 outfalls during summer dry weather conditions.
- Allow the RAs to understand potential sources of flow and therefore more effectively target and control sources contributing to the HPWQC.
- Establish a baseline for flow during summer dry weather conditions with which to measure subsequent flow reductions.

The RAs will conduct the special study within the Agua Hedionda HA to assess flows and applicable pollutants at both an outfall and watershed-wide level. The special study will include the following elements:

- Collect continuous flow monitoring data at specified major outfalls using automated flow meter and data logger
- Conduct monitoring events at identified major outfalls specified in Table 34
- Collect grab samples and analyze for applicable pollutants to identify critical conditions for the identified pollutants
- Record visual observations consistent with the transitional outfall monitoring program



- Collect in-situ physical parameters for pH, temperature, and specific conductivity
- Perform site observations at key times within the catchment areas and record all observed areas and/or sources with non-storm water flow, and
- Track flow patterns to sources for abatement or further investigation.

**Table 34: Dry Weather Data Collection by Jurisdiction for the Agua Hedionda HA**

Item	City of Carlsbad	City of Vista	City of San Marcos
Number of Focus Areas in Agua Hedionda HA	1	1	1
Number of Outfalls for Continuous Flow Monitoring	1	1	1
Minimum Time for Continuous Flow Monitoring	2 wks	2 wks	2 wks
Minimum Number of Applicable Pollutant Samples at Each Outfall Where Flow is Measured	4	4	4

#### **Assessment**

The Agua Hedionda HA RAs will perform assessments of the following elements:

- Progress Toward Interim and Final Goals
- Dry Weather Special Study

As new data and information becomes available, the RAs will perform an integrated assessment of the findings from the identified focused areas. The integrated assessment will evaluate the JRMP program implementation in relationship to the findings of the assessment for progress toward interim and final goals. This integrated assessment would be performed at this scale to identify relationships between the strategies implemented in the focus areas and outcomes related to the interim and final goals. The outcomes of this assessment could be used to help determine the effectiveness and efficiency of identified the strategies implemented.

Longer-term assessments will be performed at the WMA scale as appropriate data and information is collected and assessed.

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### 3.4 Encinas HA (904.4)

The Encinas HA is 3,400 acres in size, making it the second smallest within the WMA. The HA extends inland from the coast 2.4 miles and the highest elevation within the drainage is approximately 430 feet above mean sea level. The HA begins as a small drainage behind an industrial area where it is immediately channelized. The Encinas Creek continues down through industrial and office parks associated with Palomar Airport until it reaches the lower valley area. It then makes its way to the Pacific Ocean after crossing Interstate 5 and Pacific Coast Highway. The Encinas HA is entirely within Carlsbad and is located between the Agua Hedionda and San Marcos HAs (Figure 33). The only significant receiving water body within Encinas HA is the Pacific Ocean, however, a small creek runs the length of the HA.

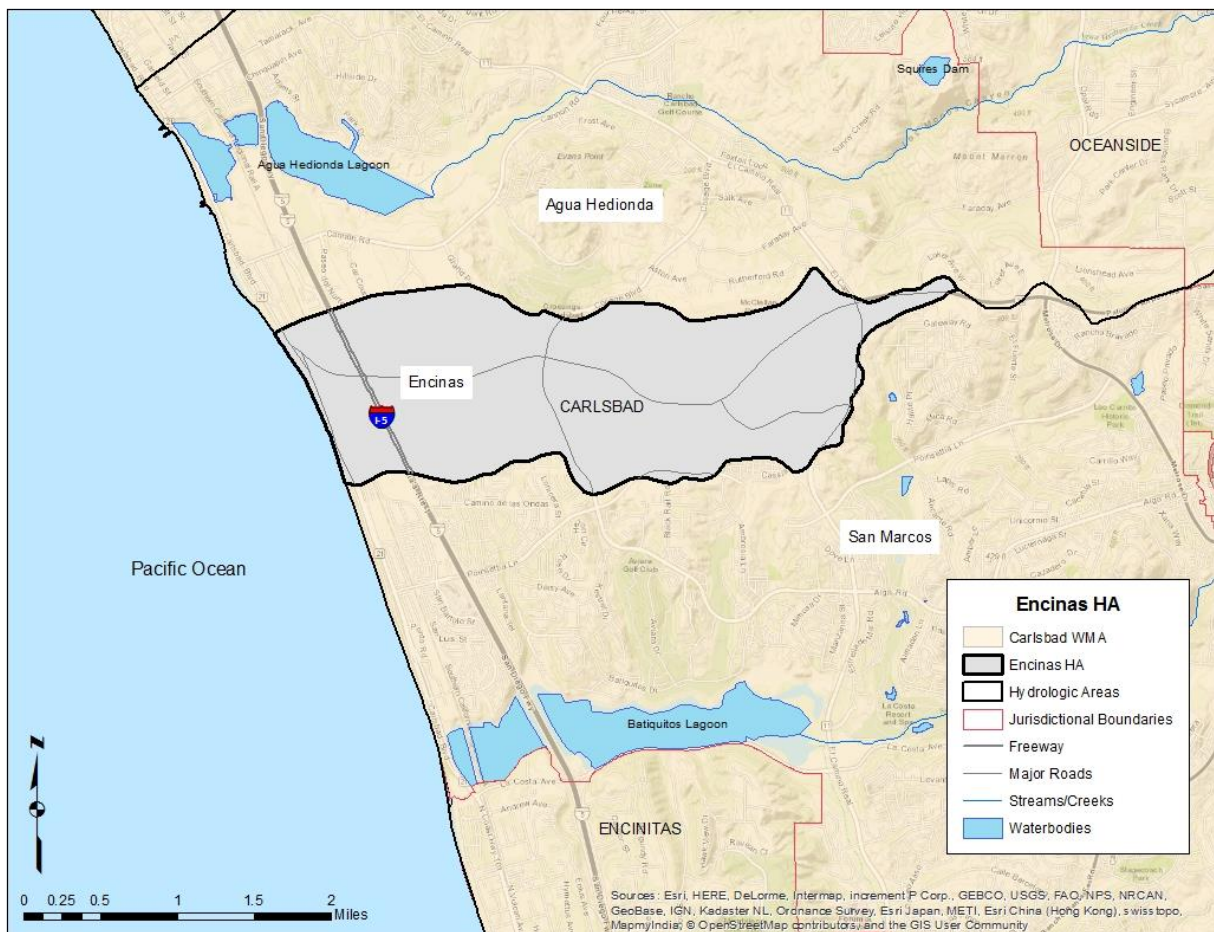


Figure 33: Encinas Hydrologic Area

### 3.4.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess the conditions of water quality in the Agua Hedionda HA, and to prioritize the identified water quality conditions. These efforts included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Facilitating workshops to receive input from the public and the watershed consultation panel
- Reviewing and analyzing the available data and information as summarized in Section 2.1 of this WQIP.

Based upon review and analysis of the gathered data and information, the following constituent groups were found to be of *low* priority for receiving waters within the Encinas HA:

- Oil & grease;
- Metals;
- Organics;
- Indicator bacteria;
- Toxicity;
- Dissolved Minerals;
- Pesticides;
- Nutrients; and
- Sediment related impacts.

#### 3.4.1.1 Priority Water Quality Conditions

There are currently no PWQCs identified for the Encinas HA. Through the review of data and information for this HA compared to other HAs within the WMA, there were no pollutants, stressors, or conditions that rose to the level of being a PWQC. The Encinas HA does not have any identified water quality impairments, water quality data within the HA is very limited, and there were no public comments received for this HA. The City of Carlsbad will implement jurisdictional strategies including core jurisdictional program strategies and planned optional strategies.

#### 3.4.1.2 Highest Priority Water Quality Conditions

Since there were no PWQCs identified for the Encinas HA, there are also no HPWQCs identified. The City of Carlsbad will implement jurisdictional strategies including core jurisdictional program strategies (Permit Sections E.2-E.7 and planned optional strategies (Permit Section B.3.b (1)(b)).

### 3.4.2 Encinas HA Sources

The following table presents a listing of inventoried sources in the Encinas HA.

**Table 35: Pollutant Generating Sources – 904.4 Encinas Hydrologic Area**

Inventory Sites/Facilities <sup>1</sup>	Quantities <sup>2</sup>	Pollutant Source Loading Potential <sup>3</sup>								
		Metals	Oil & Grease	Sediment	Pesticides	Nutrients	Bacteria/Pathogens	Dissolved Minerals	Organics	Toxicity
Agriculture	4	L	UL	L	L	L	L	UK	UL	UK
Animal Facilities	5	N	UL	L	UK	L	L	N	L	UK
Auto Repair, Fueling, or Cleaning	67	L	L	UL	UL	UK	UL	L	L	UK
Auto Parking Lots or Storage	27	L	L	L	UK	UK	UK	UL	L	UK
Auto Body Repair or Painting	12	L	L	UL	UL	UL	UL	L	L	UK
Nurseries/Greenhouses	59	L	UL	L	L	L	L	UL	UL	UK
Building Materials Retail	2	L	L	L	UL	UL	UL	UL	L	UK
Chemical and Allied Products	4	UK	UK	UK	UK	UK	UL	N	L	UK
Eating or Drinking Establishments	162	N	L	UL	UK	UK	L	UL	L	UK
Equipment Repair or Fueling	40	L	L	UL	UL	UK	UL	UL	L	UK
Fabricated Metal	42	L	L	UK	UK	UK	UL	UL	L	UK
Food Manufacturing	21	UL	UL	UL	UL	UL	UL	UL	UL	UK
General Contractors	51	UL	UL	L	UL	UL	UL	UL	UL	UK
General Industrial	98	L	L	UK	UK	UK	UK	UK	L	UK
General Retail	58	UL	UL	L	UL	UL	UL	UL	UL	UK
Motor Freight	10	L	L	UK	UK	UK	UK	UL	L	UK
Parks and Rec (incl. Golf, Cemetery)	4	UK	UK	UK	UK	L	UK	UL	UK	UK
Pest Control Services	4	N	UK	N	L	N	UK	N	UK	UK
Publicly Owned Treatment Works	1	UK	UK	UK	N	UK	L	UL	UK	UK
Primary Metal	5	L	UK	UK	UK	UK	UL	N	UK	UK
Recycling & Junk Yards	6	L	L	L	UL	UL	UL	L	L	UK
Stone/Glass Manufacturing	10	L	L	L	UL	UL	UL	UL	L	UK
Storage/Warehousing	48	L	L	L	UL	UL	UL	UL	L	UK
Municipal	69	N	N	L	N	N	UK	UL	N	UK
Construction	Varies <sup>4</sup>	UL	UL	L	UL	UL	UL	L	UL	UK
Residential	6,613 acres	L	L	L	L	L	L	L	L	UK

The highest TTWQ rated sources within each HA based on the HPWQC are identified in the table (yellow highlight signifies HPWQC). The HPWQC is associated with the sources that are likely to generate those pollutants (blue highlight). The PWQC is highlighted in green and the associated sources that are likely to generate those pollutants are depicted with an “L”.

1: Other sources are not reported in this table including: Land Development and Non-Inventoried Businesses

2: Quantities based on the RAs FY 2012 JURMP Annual Reports

3: Pollutant Source Loading Potential taken from LTEA 2011; N = None, UK = Unknown, UL = Unlikely, L = Likely

4: The quantity of construction sites is dynamic due to projects starting and completing at any given time.



### 3.4.3 Encinas HA Goals and Schedules

#### 3.4.3.1 Encinas HA Goals

Goals have not been established that apply throughout the entire Encinas HA.

### 3.4.4 Encinas HA Strategies

Table 36 identifies the Water Quality Improvement Strategies to be implemented throughout the entire Encinas HA.

As the City of Carlsbad implements strategies and analyze data, it is expected that these strategies and schedules may change through the iterative and adaptive management process.

### 3.4.5 Encinas HA Monitoring and Assessment

#### *Monitoring*

The City of Carlsbad will conduct the following monitoring in the Encinas HA:

- MS4 Outfall Monitoring (as described in Section 2.6)
- JRMP Implementation (as described in Section 2.6)
- Regulations and Policy (as described in Section 2.6)

#### *Assessment*

The City of Carlsbad will perform assessments on the data and information collected as applicable.

Table 36: Encinas HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/ Area	Target Sources								Target Pollutants								Implementation Schedule						
		City of Carlsbad	Municipal Fixed Facilities	Industrial and Commercial Facilities / Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Oil and Grease	Sediment	Pesticides	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)
PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b)))																									
1	Administrative BMPs <sup>1</sup>	HA Wide	•	•	•	•	•	•	•	•								•	•	•	•	•	•	•	•
2	Outfall Monitoring	HA Wide	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	Investigations <sup>1</sup>	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4	Development and Redevelopment Requirements <sup>1</sup>	HA Wide						•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5	Construction Site Inspections <sup>1</sup>	HA Wide			•							•				•		•	•	•	•	•	•	•	•
6	Existing Development Facilities, Areas and Activities Inspections <sup>1</sup>	HA Wide	•	•		•			•			•	•	•	•	•	•	•	•	•	•	•	•	•	•
7	MS4 Inspections/ Cleaning <sup>1</sup>	HA Wide								•	•	•				•		•	•	•	•	•	•	•	•
8	Street Sweeping <sup>1</sup>	HA Wide							•		•	•	•		•	•		•	•	•	•	•	•	•	•
9	Education and Outreach <sup>1</sup>	HA Wide	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
10	Employee Training <sup>1</sup>	HA Wide	•						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11	Inspections <sup>1</sup>	HA Wide	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
12	Investigations <sup>1</sup>	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
13	Enforcement <sup>1</sup>	HA Wide	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•		•	•	•	•

<sup>1</sup> Examples of Administrative BMPs include: Plan development, program standardization, maintaining and prioritizing inventories, updating education materials, etc.

<sup>2</sup> General descriptions provided in Section 2.4.2 of this WQIP

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### 3.5 San Marcos HA (904.5)

The San Marcos Hydrologic Area is the second largest within the WMA. The HA is about 36,000 acres in area and comprises approximately 28% of the Carlsbad WMA. The San Marcos HA has two distinctive areas separated by the Lake San Marcos impoundment – the Upper and Lower San Marcos HA areas (Figure 34). The Upper Hydrologic Area includes drainage areas in the County of San Diego, and the cities of San Marcos and Escondido, that runoff through Upper San Marcos Creek to Lake San Marcos. The Lower Hydrologic Area consists of portions of the cities of Carlsbad, Encinitas, San Marcos and the County of San Diego.

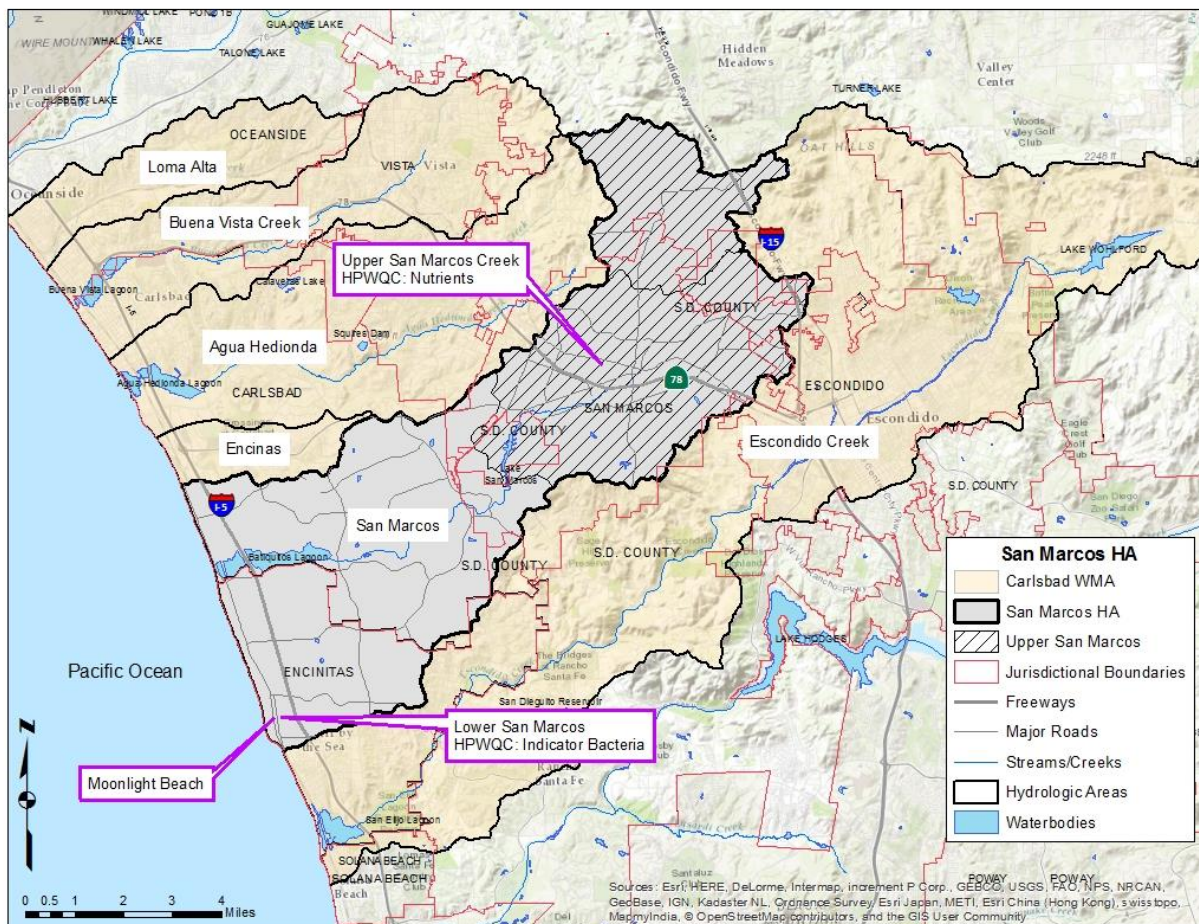


Figure 34: San Marcos Hydrologic Area

The major receiving waters within the HA are San Marcos Creek, Encinitas Creek, Batiquitos Lagoon, and the Pacific Ocean. Each of these receiving waters are highly valued within the hydrologic area not only for their habitat but for providing areas of recreational use. Along San Marcos Creek, there is boating (Lake San Marcos), fishing, birdwatching, and swimming activities along the entire coastline of the hydrologic area.

San Marcos Creek originates on the western slopes of the Merriam Mountains in west central San Diego County and discharges in to the Pacific Ocean, 14.6 miles away, via Batiquitos Lagoon. Encinitas Creek is another one of the major tributaries in the HA, originating in the hills southwest of Questhaven Road and





Moonlight Beach: Recreational Use

paralleling El Camino Real before it converges with San Marcos Creek at the southeastern corner of Batiquitos Lagoon. The Batiquitos Lagoon is located in the City of Carlsbad and encompasses 540 acres of wetland habitat, including least tern nesting sites. San Marcos Creek and Encinitas Creek together make up the main source of freshwater to the lagoon. The highest elevation within the HA is approximately 1,540 feet above mean sea level. Lake San Marcos is the largest impoundment within the HA. The Cottonwood Creek sub-basin is also located in this HA which drains a portion of Encinitas directly into the Pacific Ocean. The San Marcos HA is primarily located in the cities of San Marcos, Carlsbad, Encinitas, and the County of San Diego, with a small portion in Escondido.

Approximately 72 percent of the watershed is developed (28 percent is open space or undeveloped) and is comprised of the following land uses: residential (33 percent), agricultural (6 percent), commercial and industrial (7 percent) roads and railway (13 percent), and other land uses (13 percent). All of these land uses are potential sources of pollutants and have potential impacts on the water quality discharged from the RAs' storm drain system. The Upper San Marcos Creek area supports agricultural (primarily in the County of San Diego), urbanized and open space land uses. Lower San Marcos has a significant amount of open space as well as urbanized areas.



Batiquitos Lagoon: Wetlands Habitat and Least Tern Nesting Sites



Through the development in the HA, there has been channelization of sections of the tributaries to upper San Marcos Creek, primarily in the City of San Marcos to protect properties from flood damage. The impact of this channelization has been the fragmentation of riparian habitat corridors and the reduction in the benefits of natural channel and wetland features.

### 3.5.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess the conditions of water quality in the San Marcos hydrologic area, and to prioritize the identified water quality conditions. These efforts included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Holding facilitated workshops to receive input from the public and the watershed consultation panel
- Reviewing and analyzing the available data and information as summarized in Section 2.1 of this WQIP

Based upon review and analysis of the gathered data and information, the following constituent groups were found to be of *low* priority for receiving waters within the San Marcos hydrologic area:

- oil & grease;
- metals;
- organics;
- pesticides under dry conditions; and
- sediment related impacts under dry conditions.

#### 3.5.1.1 Priority Water Quality Conditions

The RAs used the information gathered to assess the receiving water conditions (refer to Section 2.1, Table 3) and the impacts from MS4 sources (refer to Section 2.1, Table 4) to develop a “list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters” (Permit Provision B.2.c.). The assessment of data and information identified a total of 10 PWQCs for the San Marcos HA.

**Table 37: San Marcos HA Priority Water Quality Conditions**

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody
Pacific Ocean Shoreline at Moonlight Beach	San Marcos Hydrologic Area	904.50	Indicator Bacteria	REC-1	Dry and Wet Weather	Carlsbad, Encinitas, Escondido, San Marcos, San Diego County
San Marcos Creek - Lower	San Marcos Hydrologic Area	904.51	Nutrients <sup>1</sup>	WARM	Dry Weather	Carlsbad, Encinitas, Escondido, San Marcos, San Diego County
Encinitas Creek	San Marcos Hydrologic Area	904.51	Toxicity	WARM	Dry Weather	Carlsbad, Encinitas
San Marcos Lake <sup>2</sup>	San Marcos Hydrologic Area	904.52	Nutrients <sup>1</sup>	WARM	Dry and Wet Weather	Escondido, San Marcos, San Diego County
San Marcos Creek- Upper	San Marcos Hydrologic Area	904.52 and 904.53	Nutrients <sup>1</sup>	WARM	Dry and Wet Weather	Escondido, San Marcos, San Diego County
San Marcos Creek- Upper below Via Vera Cruz	San Marcos Hydrologic Area	904.52 and 904.53	Indicator Bacteria	REC-1	Dry and Wet Weather	Escondido, San Marcos, San Diego County
All water bodies within the Carlsbad WMA	All	All	Trash	All	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>3</sup>
All water bodies within the Carlsbad WMA	All	All	Riparian Habitat Degradation	WARM;REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>3</sup>

<sup>1</sup> Based on 2011 LTEA, nutrients category includes at least two or more of the following pollutants: Dissolved Phosphorous; Orthophosphate; Total Phosphorous; Total Kjeldahl Nitrogen; Total Nitrogen; Eutrophication; or Benthic Algae

<sup>2</sup> San Marcos Lake is privately owned by the Citizens Development Corporation.

<sup>3</sup>This is a watershed-wide PWQC, and all jurisdictions are listed. However, only the Cities of Carlsbad, Encinitas, Escondido, and San Marcos and County of San Diego are located within the San Marcos HA.

### 3.5.1.2 Highest Priority Water Quality Conditions

Once the PWQCs were identified, the next step was to “identify the highest priority water quality conditions to be addressed by the WQIP and provide the rationale for selecting a subset of the [priority] water quality conditions identified”. The RAs established the process outlined in Section 2.2 to identify the HPWQCs within the Carlsbad WMA. Figure 7 provides an illustration of the process. Although a subset of priority water quality conditions are identified as the highest priority condition(s), other priority water quality conditions are expected to be positively impacted through strategies identified for implementation by the RAs (LTEA, 2011 and CASQA). Table 44 identifies the multi-pollutant benefits of the strategies to be implemented within the HA.

Table 38 lists the two HPWQCs for the San Marcos HA that was identified using the process outlined in Section 2.2. The rationale for selecting these two HPWQCs was based on regulatory drivers identified in Step 1 of Figure 7. The two HPWQCs include *indicator bacteria* (dry and wet weather conditions) at the Pacific Ocean Shoreline at Moonlight Beach (Lower San Marcos HA), and nutrients (dry and wet weather) as a HPWQC San Marcos Creek (Upper San Marcos HA). More information on the rationale for HPWQC identification is described below.

#### Lower San Marcos Hydrologic Area

##### *Bacteria TMDL- San Marcos Creek Hydrologic Area*

Moonlight Beach, located adjacent to downtown Encinitas, draws approximately 500,000 locals and tourists each year. Keeping the beach clean and swimmable is a top priority for the City of Encinitas. The Pacific Ocean Shoreline at Moonlight Beach has been identified as a water body that is subject to the requirements of San Diego Beaches and Creeks Project I Bacteria TMDL. The TMDL is for contact recreation (REC-1) beneficial use impairments and has established Water Quality Based Effluent Limits (WQBEL)s for bacteria. The TMDL WQBELs were incorporated into the Permit, making them legally enforceable. While the REC-1 beneficial use impairment for the Pacific Ocean shoreline at Moonlight Beach has since been removed from the 303(d) list, monitoring in accordance with the TMDL and compliance with wet and dry weather WQBELs are still required. Based on the process outlined in Section 2.2, this regulatory context led to the identification of indicator bacteria at the Pacific Ocean Shoreline at Moonlight Beach as the HPWQC for Lower San Marcos HA. The City of Encinitas is committed to protecting and improving water quality at the beach and meeting the strict WQBELs that will go into effect in the coming years, as described later in this section.

#### Upper San Marcos Hydrologic Area

The Upper San Marcos Creek (USMC) Watershed is comprised of the Richland and Twin Oaks Hydrologic Subareas. Lake San Marcos, located at the southern boundary of the Richland Subarea, is an impoundment created by a dam at San Marcos Creek.

The Lake is 303(d) listed for high ammonia (as nitrogen) and nutrients, and the Creek is 303(d) listed for phosphorous, dichlorodiphenyldichloroethylene (DDE), sediment toxicity, and selenium. The majority of these listings impair the WARM beneficial use. The EPA has scheduled a TMDL for nutrients to be developed and initiated for the Lake and Creek in 2019. However, the San Diego RWQCB has agreed in concept to allow the stakeholders of the USMC watershed to proceed with a non-TMDL approach to address the nutrient 303(d) listing. According to Resolution R9-2010-0079<sup>18</sup>, “In April 2009, San Diego

<sup>18</sup> R9-2010-0079, A Resolution Requesting the State Water Resources Control Board to Approve Funding from the State Water Pollution Cleanup and Abatement Account for the Lake San Marcos Nutrient Diagnostic and Cleanup Planning Study.

Water Board Executive Officer encouraged likely Stakeholders to proceed with a voluntary investigation and clean up as a model, in lieu of a San Diego Water Board directed Investigative Order and/or other enforcement action”.



Lake San Marcos: Recreational Use and Dam

In June 2011, the San Diego RWQCB entered into the Lake San Marcos Work Group Participation Agreement with the following agencies:

- City of San Marcos
- County of San Diego
- City of Escondido
- California Department of Transportation (Caltrans)
- San Marcos Unified School District (SMUSD)
- Vallecitos Water District (VWD) and
- San Diego RWQCB.

The purpose of the Participation Agreement is “to reasonably achieve nutrient Water Quality Objectives (WQOs) in the Lake and Creek”. The agreement specifies that work conducted by the group shall be “the identification and feasibility assessment of alternative processes, means, methods, and technologies for abating the nutrient conditions in the Lake and Creek, improving the existing nutrient water quality conditions in the Creek and Lake, and determining feasible *site-specific* Water Quality Objectives” (DBSA, 2016).

Caltrans withdrew from the Participation Agreement on August 25, 2015 and SMUSD withdrew from the Participation Agreement on October 9, 2015.

In September 2011, the San Diego RWQCB issued Investigative Order R9-2011-0033 to Citizens Development Corporation (CDC, Lake San Marcos owner) for the investigation of nutrient impairment in the Lake San Marcos. The Investigative Order directs CDC to complete specific tasks to evaluate the sources and extent of nutrient impairment in the Lake and to develop recommendations for cleanup and/or additional investigation.

CDC and four of the public agencies (PAs), are parties to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) lawsuit *Citizens Development Corporation, Inc. v. County of San Diego, City of San Marcos, City of Escondido, Hollandia Dairy, and Vallecitos Water District*, (these four

agencies are referred to as the public agency defendants [PADs]) U.S. District Court, Southern District of California Case No. 12-cv-0334-GPC-KSC. CDC and the PADs are currently working cooperatively through mediation to identify the causes of nutrient impairment in Lake San Marcos and in the USMC Watershed and to identify remedial alternatives, with the objective of reaching agreement on an allocation of responsibility for the costs of this work and the ultimate accepted remedial alternative.

From approximately 2012 through 2015 field studies and data collection activities were conducted within Lake San Marcos and the USMC watershed. This diagnostic stage included the collection and evaluation of dry and wet weather surface water samples, Lake water samples, sediment samples within the Lake and watershed, and groundwater samples.

#### *Remedial Investigation/Feasibility Study Development*

On August 14, 2015, a Remedial Investigation/Feasibility study (RI/FS) work plan was approved by the San Diego RWQCB for the Lake San Marcos and Upper San Marcos Creek Watershed. The work plan included the preparation of an RI report, screening-level human health and ecological risk assessments, and an FS to select Lake and Watershed clean up alternatives. The FS component of the report will evaluate cleanup alternatives and provide recommendations for selection of a preferred alternative.

The Draft RI/FS was completed and submitted to the San Diego RWQCB in January 2016. The RI was developed to understand Lake San Marcos and the USMC Watershed through a Site Conceptual Model. The RI included the compilation and analysis of background information and data collected through field studies, along with an evaluation of groundwater inputs. A Lake and Watershed model were developed to simulate current water quality conditions and to quantify water, sediment, and nutrient budgets for the Lake and Watershed. Additionally, the models were used to predict the Watershed/Lake response to various potential remedial technology options.

A human health and ecological risk screening was conducted and indicates that low Dissolved Oxygen (DO) and nutrients are contaminants of potential concern in both San Marcos Creek and Lake San Marcos. A Watershed remedial action objective (RAO) has been defined to reduce nutrient loading to Lake San Marcos. Subsequently, defined Lake San Marcos RAOs are to (1) improve DO conditions in the Lake, (2) reduce nutrient concentrations in the Lake, (3) reduce chlorophyll a concentrations/improve water clarity, and (4) reduce nutrient release from sediments to the water column (DBSA, 2016).

A feasibility study was completed to evaluate remedial technology alternatives to address the defined RAOs. Low-impact development (LID), pollution controls, supplementary agricultural best management practices (BMPs) and stream restoration/flocculant (phosphorus inactivation) options have been evaluated in detail for the Watershed. Diffused aeration, oxygenation, flocculation (phosphorus inactivation), biomanipulation, and hypolimnetic extraction (selective withdrawal) have been evaluated in detail for the Lake. (DBSA, 2016)

The selected preferred remedy consists of supplementary agricultural BMPs and stream restoration/flocculation (phosphorus inactivation) for the Watershed, and diffused aeration, flocculation (phosphorus inactivation), and hypolimnetic extraction (selective withdrawal) for the Lake. (DBSA, 2016)

Based on similar projects, the selected remedy is anticipated to reduce overall nutrient loading to the Lake San Marcos by approximately 40 to 50 percent, significantly drive down chlorophyll and nutrient



concentrations, allow DO concentrations to remain sufficiently elevated throughout the year, and improve/protect beneficial uses (DBSA, 2016).

Identified components of the preferred remedy will need to be pilot tested before full-scale implementation. The goal of pilot testing would be to simulate full-scale implementation as much as possible while obtaining the design data needed to scale-up and cost the remedy for complete implementation. Pilot testing components, along with collection of baseline and performance monitoring will be specified and detailed in a Remedial Design Work Plan, once the Final RI/FS has been approved by the San Diego RWQCB.

A public meeting on January 25, 2016 was conducted to provide an overview of the RI/FS, answer questions, and to initiate a 30-day public comment period. Since the close of the public comment period, the RI/FS is being revised based on comments received and will be subsequently finalized and approved by the San Diego RWQCB. After the approval, the remedial design work mentioned above would be developed and once this is approved the San Diego RWQCB would provide further direction on requirements to implement the approved remedies. The 2016 Draft RI/FS can be accessed at [http://geotracker.waterboards.ca.gov/profile\\_report.asp?global\\_id=T10000003261](http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000003261).

The CERCLA lawsuit, Draft RI/FS, Participation Agreement, and the issuance of Investigative Order R9-2011-0033 have resulted in the identification of nutrients as a HPWQC in San Marcos Creek within the USMC watershed limits. The extent of the HPWQC is limited to the jurisdictional areas of the RAs above and around Lake San Marcos.

As the RI/FS process is currently on-going, it is anticipated the goals for the HPWQC may be revised based on RI/FS document revisions, pilot tests, and more refined data and information. Any updates to the interim or final goals will be included in future Carlsbad WQIP Annual Reports.

**Table 38: San Marcos HA Highest Priority Water Quality Conditions**

Hydrologic Area	Applicable Receiving Water	Highest Priority Water Quality Condition (Condition, Pollutant, or Stressor)	Temporal Extent
Lower San Marcos HA	Pacific Ocean Shoreline at Moonlight Beach	Indicator Bacteria	Dry and Wet Weather
Upper San Marcos	San Marcos Creek	Nutrients	Dry and Wet Weather

### 3.5.2 San Marcos HA Sources

The RAs within San Marcos HA have identified and targeted land uses and areas that are suspected of causing and contributing to nutrient and/or bacteria loading within the HA. These areas and land uses are described in more detail in Section 3.5.4.1.

Table 39 presents a listing of inventoried sources in the entire San Marcos HA (both upper and lower portions) and their association with the San Marcos HA HPWQC and PWQCs based on source loading potential (2011 LTEA). The HPWQC for Lower San Marcos HA is indicated by bacteria and highlighted in yellow. The likely sources include the following (highlighted in blue):

- Animal facilities,
- Nurseries/greenhouses,
- Eating or drinking establishments,
- Publically owned treatment works,

- Roads, streets and parking, and
- Residential facilities.

The HPWQC for Upper San Marcos HA is indicated by nutrients and highlighted in yellow. The likely sources include the following (highlighted in blue):

- Animal facilities,
- Nurseries/greenhouses,
- Parks and Recreation,
- Roads, streets and parking, and
- Residential facilities

The associations identified in the table below are based on the LTEA process developed for associating known pollutant sources with the potential for those sources to generate pollutant loadings for the identified pollutant categories. Furthermore, other PWQCs, toxicity, TDS, and trash in this HA, are identified (in green columns) to further highlight that similar sources have the potential to generate pollutants related to the HPWQC and PWQCs. HPWQCs and PWQCs will have associated load reductions based on the strategies implemented within the HA. For the purposes of identifying geographic area to focus strategies and efforts, the RAs in this HA used their jurisdictional inventories to identify potential sources of the HPWQC and PWQCs. The entire San Marcos HA was analyzed using the most recent available data to quantify the inventoried sites/facilities that are likely to contribute to the HPWQC and PWQCs, helping to shape strategies within this area.

While the 2011 LTEA did not analyze or include riparian habitat degradation, the source and pollutants included in the table have the potential to degrade riparian habitat within the HA by contributing pollutants into the MS4. Increased impervious surfaces and hydromodification impacts are also sources contributing to riparian habitat degradation.

Additionally, the Draft RI/FS provides information on watershed inputs of nutrients and sediment loads to the Upper San Marcos Creek.

Watershed runoff concentrations of sediment and nutrients vary naturally with soil characteristics and land use. For example, the nutrient and sediment yield from developed agricultural and urban areas are typically much higher loads than undeveloped areas. Impervious cover (e.g., streets, alleys, parking lots, sidewalks, and roofs) generates much higher runoff than undeveloped pervious areas and, as a result, have a higher yield. Build-up of regionally generated pollutants during the extended dry season and between storms is subject to wash-off during rainfall events. Fertilizers, lawn wastes, leaking pipes, and other anthropogenic sources increase the concentrations of nutrients and sediments from developed areas unless sequentially removed by existing source, rate controls (such as wet detention basins, and volume controls (e.g., low impact development) (2016 Draft RI/FS).

Section 3.1.3 of the 2016 Draft RI/FS suggests a contribution of nutrients from historic agricultural operations. These lands have largely been sold for redevelopment, and the remaining land currently zoned for agriculture is approximately 11 percent (%). The RWQCB is scheduled to release Tentative Orders in June 2016 to regulate waste discharges from commercial agricultural operations. BMP implementation is expected to be conducted by the owners/operators of commercial agricultural sources through the RWQCB's enforcement of the general waste discharge requirements.

**Table 39: Pollutant Generating Sources – 904.5 San Marcos Hydrologic Area**

Inventory Sites/Facilities <sup>1</sup>	Quantities <sup>2</sup>	Pollutant Source Loading Potential <sup>3</sup>									
		Metals	Oil & Grease	Sediment	Pesticides	Nutrients	Bacteria/Pathogens	Dissolved Minerals	Organics	Trash	Toxicity
Aggregates/Mining	1	L	L	L	UL	UL	UL	UL	L	UK	UK
<b>Animal Facilities</b>	45	N	UL	L	UK	L	L	N	L	L	UK
Auto Repair, Fueling, or Cleaning	136	L	L	UL	UL	UK	UL	L	L	L	UK
Auto Parking Lots or Storage	4	L	L	L	UK	UK	UK	UL	L	UK	UK
Auto Body Repair or Painting	48	L	L	UL	UL	UL	UL	L	L	L	UK
<b>Nurseries/Greenhouses</b>	96	L	UL	L	L	L	L	UL	UL	UK	UK
Building Materials Retail	30	L	L	L	UL	UL	UL	UL	L	UK	UK
Chemical and Allied Products	4	UK	UK	UK	UK	UK	UL	N	L	UK	UK
Concrete Manufacturing	4	L	L	L	UL	UL	UL	UL	L	UK	UK
Eating or Drinking Establishments	501	N	L	UL	UK	UK	L	UL	L	L	UK
Equipment Repair or Fueling	87	L	L	UL	UL	UK	UL	UL	L	L	UK
Fabricated Metal	39	L	L	UK	UK	UK	UL	UL	L	UK	UK
Food Manufacturing	30	UL	UL	UL	UL	UL	UL	UL	UL	UK	UK
General Contractors	129	UL	UL	L	UL	UL	UL	UL	UL	L	UK
General Industrial	76	L	L	UK	UK	UK	UK	UK	L	L	UK
General Retail	65	UL	UL	L	UL	UL	UL	UL	UL	UK	UK
Health Services	1	N	UL	L	UK	UK	UL	UK	L	UK	UK
Motor Freight	23	L	L	UK	UK	UK	UK	UL	L	UK	UK
Offices	2	UK	UK	UK	UK	UK	UK	UK	UK	L	UK
Parks and Rec (incl. Golf, Cemetery)	9	UK	UK	UK	UK	L	UK	UL	UK	L	UK
Pest Control Services	1	N	UK	N	L	N	UK	N	UK	UK	UK
Pool and Fountain Cleaning	5	N	N	N	N	UK	N	N	UK	UK	UK
Publicly Owned Treatment Works	3	UK	UK	UK	N	UK	L	UL	UK	UL	UK
Primary Metal	1	L	UK	UK	UK	UK	UL	N	UK	UK	UK
Recycling & Junk Yards	4	L	L	L	UL	UL	UL	L	L	L	UK
<b>Roads, Streets &amp; Parking</b>	1	L	L	L	UL	L	L	L	L	L	UK
Stone/Glass Manufacturing	10	L	L	L	UL	UL	UL	UL	L	UK	UK
Storage/Warehousing	108	L	L	L	UL	UL	UL	UL	L	UK	UK
Municipal	119	N	N	L	N	N	UK	UL	N	L	UK
Construction	Varies <sup>4</sup>	UL	UL	L	UL	UL	UL	L	UL	L	UK
<b>Residential</b>	12,977 acres	L	L	L	L	L	L	L	L	L	UK

The highest TTWQ rated sources within each HA based on the HPWQC are identified in the table (yellow highlight signifies HPWQC. The HPWQC is associated with the sources that are likely to generate those pollutants (blue highlight). The PWQC is highlighted in green and the associated sources that are likely to generate those pollutants are depicted with an “L”.

1: Other sources are not reported in this table including: Land Development and Non-Inventoried Businesses. Bolded sources are sources associated with both the Lower and Upper San Marcos Creek Watershed HPWQC

2: Quantities based on the RAs FY 2012 JURMP Annual Reports

3: Pollutant Source Loading Potential taken from LTEA 2011; N = None, UK = Unknown, UL = Unlikely, L = Likely

4: The quantity of construction sites is dynamic due to projects starting and completing at any given time.

NOTE: The 2011 LTEA did not include degradation of riparian habitat. However all sources and pollutants included in the table can impact riparian habitat degradation.

### 3.5.3 San Marcos HA Goals and Schedules

Identifying goals and the means to achieve them is a fundamental component of the Carlsbad WMA WQIP. Goals define realistic water quality improvement outcomes and provide direction and purpose to program planning. Interim and final numeric goals were identified as benchmarks for program performance and assessing progress through a measureable and quantifiable mechanism. The interim and final goals for the San Marcos HA are described in the sections below.

#### 3.5.3.1 Lower San Marcos HA Goals

The Pacific Ocean Shoreline at Moonlight Beach, located within the San Marcos HA, is included as part of the TMDL requirements of the MS4 Permit Attachment E, Section 6. As a result, the RAs have established both interim and final goals for wet and dry weather in the HA that are consistent with the TMDL WQBELs for indicator bacteria. The goals include both receiving water and MS4 targets. The goals, although technically required of the entire HA that ultimately drains to the Pacific Ocean Shoreline, are primarily related to the Moonlight Beach drainage area within the Lower Hydrologic Area (downstream of Lake San Marcos). These goals are outlined in Table 41.

The means for achieving these goals are identified in the strategies discussion in Section 3.5.4. The strategies implemented to achieve the goals within the Cottonwood Creek Basin, which drains to Moonlight Beach, have been designed to result in load reductions for multiple pollutants, including bacteria. These strategies include a variety of structural BMPs, including LID features, and non-structural BMPs. Table 40 identifies anticipated load reductions for bacteria and other pollutants associated with strategy implementation upstream of Moonlight Beach. Load reductions for structural BMPs are based on continuous simulation modeling completed for the Cottonwood Creek Watershed LID Retrofit Plan. Non-structural BMP load reductions are based on a literature review study completed by the City of San Diego (City of San Diego, 2014).

Mechanisms for measuring progress towards and ultimately achieving these goals are included in the monitoring, assessment and iterative process sections.

**Table 40: Estimated Wet Weather Pollutant Load Reductions from Cottonwood Creek Basin Strategies<sup>1</sup>**

Strategy	Fecal Coliform	Total Coliform	Enterococcus	Volume	Sediment (TSS)	Total Nitrogen	Total Phosphorus	Copper	Lead	Zinc
Nonstructural BMPs (All) <sup>2</sup>	10%	10%	10%	3% <sup>3</sup>	10%	10%	10%	10%	10%	10%
Ultraviolet Bacteria Treatment Facility Wet Season Operation <sup>4</sup>	2%	2%	2%	0%	0%	0%	0%	0%	0%	0%
Highway 101 Green Street Retrofit <sup>5</sup>	1.0%	1.0%	1.0%	1.0%	1.3%	0.6%	0.5%	1.9%	1.7%	8.5%
Sylvia Green Street Retrofit <sup>5</sup>	8.7%	8.7%	8.7%	6.0%	3.5%	7.0%	7.4%	6.4%	4.4%	6.0%
Arden Drive and San Dieguito Drive LID <sup>5</sup>	6.3%	6.3%	6.3%	2.7%	1.6%	3.0%	3.2%	2.7%	2.0%	2.6%
Ocean View Avenue LID <sup>5</sup>	2.2%	2.2%	2.2%	1.5%	0.9%	1.7%	1.8%	1.6%	1.1%	1.5%
City Public Works Yard LID <sup>5</sup>	0.4%	0.4%	0.4%	0.6%	0.7%	0.3%	0.3%	1.1%	1.0%	4.7%
Encinitas Viewpoint Park LID <sup>5</sup>	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%
<b>Totals</b>	<b>30.6%</b>	<b>30.6%</b>	<b>30.6%</b>	<b>14.8%</b>	<b>18.2%</b>	<b>22.7%</b>	<b>23.2%</b>	<b>23.7%</b>	<b>20.2%</b>	<b>33.3%</b>
<b>TMDL Load Reduction Target</b>	<b>19.0%</b>	<b>18.5%</b>	<b>20.2%</b>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>

Notes:

TSS – Total suspended solids

Totals may be slightly different than the sums of the individual reductions due to rounding.

1. This table shows load reductions associated with both core program strategies and optional strategies. Reductions for residential LID implementation, such as downspout disconnection, are not explicitly included, and nonstructural BMP load reductions are based on conservative assumptions. The extent to which optional strategies shown in this table will be implemented will depend in part on progress toward numeric goals, as shown by monitoring results.
2. Nonstructural BMP load reduction percentages are based on a literature review study completed by the City of San Diego (City of San Diego, 2014). That study used conservative assumptions about the rate of BMP implementation by the general public, so the numbers provided should be considered a relatively low end estimate. It is possible that larger reductions could be achieved.
3. Estimate based on modeling of non-structural BMPs in the San Dieguito WMA (San Dieguito WMA Responsible Parties, 2015).
4. While the UV facility removes 99% of bacteria water that it treats, it is expected that a relatively small percentage of wet weather flows would be routed through the UV facility due to capacity restrictions. The load reduction included herein is a preliminary estimate and may be revised as part of looking into the feasibility of operating the UV facility during wet weather.
5. Load reductions and volume reductions for LID projects are provided as percentages of the total Cottonwood Creek Basin loading. The data is based on continuous simulation modeling completed for the Cottonwood Creek Watershed LID Retrofit Plan (City of Encinitas, 2015). The EPA's System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) model was used for this effort. For bacteria, fecal coliform reductions were directly modeled, and total coliform and Enterococcus were assumed to have the same load reduction as fecal coliform.



**Table 41: Interim and Final Goals for Lower San Marcos HA**

Hydrologic Area: Lower San Marcos			
High Priority Water Quality Condition: Impairment of REC-1		Applicable Receiving Water(s): Pacific Ocean Shoreline at Moonlight Beach	
Pollutant/Stressor: Indicator Bacteria		Responsible Agencies: City of Encinitas	
DRY WEATHER			
Interim Goal (2013-2018) 2018	Interim Goal (2018-2020) 2020	Final Goal (2018-2021) 2021	
Reduce the anthropogenic surface water runoff at identified MS4 outfall(s) by 10% <sup>1</sup>	Meet TMDL Interim Compliance Requirements (See Note A)	Meet TMDL Final Compliance Requirements (See Note B)	
WET WEATHER			
Interim Goal (2013-2018) 2017	Interim Goal (2018-2023) 2021	Interim Goal (2023-2028) 2028	Final Goal (2028-2033) 2031
10% reduction in dry weather anthropogenic surface water runoff during wet weather season at identified outfalls <sup>1</sup>	20% reduction in dry weather anthropogenic surface water runoff during wet weather season at identified outfalls <sup>1</sup>	Meet TMDL Interim Compliance Requirements (See Note C)	Meet TMDL Final Compliance Requirements (See Note D)

<sup>1</sup>Flow reduction goals are currently based on best professional judgment as current flow data is not available. The goals may be adapted as monitoring data/information is gathered, analyzed and baselines are established.

<sup>2</sup>Request moving Interim TMDL Compliance Date from April 4, 2016, (per Permit Attachment E, 6.(1) to April 4, 2020 to allow adequate time to investigate and mitigate dry weather flows through the adaptive management process of the WQIP.

<sup>3</sup>Request moving Interim TMDL Compliance Date from April 4, 2021, (per Permit Attachment E, 6.(1) to April 4, 2028 to allow adequate time to monitor progress through the adaptive management process of the WQIP.

**Note A:**

Meet TMDL Interim Compliance Requirements [Attachment E, 6.c(3)], which are:

- (a) No direct or indirect discharge from the Moonlight Beach MS4 outfall to the Pacific Ocean; or
- (b) No exceedances of final receiving water limitations for bacteria (i.e., 30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) in the Pacific Ocean, at or downstream of the Moonlight Beach MS4 outfall; or
- (c) No exceedances of the final effluent limitations for bacteria (30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) at the Moonlight Beach MS4 outfall; or
- (d) Reduce the load of bacteria from MS4 discharges to the Pacific Ocean downstream of Moonlight Beach MS4 outfall by at least 82.82% for TC, 82.55% for FC and 96.03% for ENT for dry weather; or
- (e) Demonstrate that exceedances of the final receiving water limitations in the receiving water are due to loads from natural sources, and pollutant loads from the Moonlight Beach MS4 outfall are not causing or contributing to the exceedances; or

- (f) No exceedances of interim receiving water limitations for bacteria (i.e., reduce the “existing” (2002) exceedance frequency of the 30-day geometric mean by 50%) in the Pacific Ocean downstream of the Moonlight Beach MS4 outfall; or
- (g) Pollutant load reductions for discharges of bacteria from the Moonlight Beach MS4 outfall are greater than or equal to the interim effluent limitations of 41.41% for TC, 41.28% for FC and 48.02% for ENT for dry weather; or
- (h) Implement a WQIP that is accepted by the Regional Board and that provides reasonable assurance that the interim TMDL compliance requirements (i.e., 6.c.(3)(a) through 6.b.(3)(h)) will be achieved.

**Note B:**

Meet TMDL Final Compliance Requirements [Attachment E, 6.b(3)], which are:

- (a) No direct or indirect discharge from the Moonlight Beach MS4 outfall to the Pacific Ocean; or
- (b) No exceedances of final receiving water limitations for bacteria (i.e., 30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) in the Pacific Ocean, at or downstream of the Moonlight Beach MS4 outfall; or
- (c) No exceedances of the final effluent limitations for bacteria (30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) at the Moonlight Beach MS4 outfall; or
- (d) Reduce the load of bacteria from Moonlight Beach MS4 outfall by at least 82.82% for TC, 82.55% for FC and 96.03% for ENT for dry weather; or
- (e) Demonstrate that exceedances of the final receiving water limitations in the receiving water are due to loads from natural sources, and pollutant loads from the Moonlight Beach MS4 outfall are not causing or contributing to the exceedances; or
- (f) Implement a WQIP that is accepted by the Regional Board and that provides reasonable assurance that the final TMDL compliance requirements (i.e., 6.b.(3)(a) through 6.b.(3)(e)) will be achieved.

**Note C:**

Meet TMDL Interim Compliance Requirements [Attachment E, 6.c(3)], which are:

- (a) No direct or indirect discharge from the Moonlight Beach MS4 outfall to the Pacific Ocean; or
- (b) No exceedances of final receiving water limitations for bacteria (i.e., 30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) in the Pacific Ocean, at or downstream of the Moonlight Beach MS4 outfall; or
- (c) No exceedances of the final effluent limitations for bacteria (30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) at the Moonlight Beach MS4 outfall; or
- (d) Reduce the load of bacteria from MS4 discharges to the Pacific Ocean Shoreline downstream of Moonlight Beach MS4 outfall by at least 18.47% for TC, 18.89% for FC and 20.19% for ENT for wet weather; or
- (e) Demonstrate that exceedances of the final receiving water limitations in the receiving water are due to loads from natural sources, and pollutant loads from the Moonlight Beach MS4 outfall are not causing or contributing to the exceedances; or
- (f) No exceedances of interim receiving water limitations for bacteria (i.e., reduce the “existing” (2002) exceedance frequency of the 30-day geometric mean by 50%) in the Pacific Ocean downstream of the Moonlight Beach MS4 outfall; or
- (g) Pollutant load reductions for discharges of bacteria from the Moonlight Beach MS4 outfall are greater than or equal to the interim effluent limitations of 9.24% for TC, 9.49% for FC and 10.10% for ENT for wet weather; or
- (h) Implement a WQIP that is accepted by the Regional Board and that provides reasonable assurance that the interim TMDL compliance requirements (i.e., 6.c.(3)(a) through 6.b.(3)(h)) will be achieved.

**Note D:**

Meet TMDL Final Compliance Requirements [Attachment E, 6.b(3)], which are:

- (a) No direct or indirect discharge the Moonlight Beach MS4 outfall to the Pacific Ocean; or
- (b) No exceedances of final receiving water limitations for bacteria (i.e., 30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) in the Pacific Ocean, at or downstream of the Moonlight Beach MS4 outfall; or
- (c) No exceedances of the final effluent limitations for bacteria (30-day geometric mean and single sample maximum for TC [1,000 MPN/100 mL, 10,000 MPN/100 mL], FC [200 MPN/100 mL, 400 MPN/100 mL] and ENT [35 MPN/100 mL, 104 MPN/100 mL]) at the MS4 outfalls; or
- (d) Reduce the load of bacteria from Moonlight Beach MS4 outfall by at least 18.47% for TC, 18.89% for FC and 20.19% for ENT for wet weather; or
- (e) Demonstrate that exceedances of the final receiving water limitations in the receiving water are due to loads from natural sources, and pollutant loads from the Moonlight Beach MS4 outfall are not causing or contributing to the exceedances; or
- (f) Implement a WQIP that is accepted by the Regional Board and that provides reasonable assurance that the final TMDL compliance requirements (i.e., 6.b.(3)(a) through 6.b.(3)(e)) will be achieved.

#### 3.5.3.2 Upper San Marcos HA Goals

Goals for the Upper San Marcos HA were derived from the modeling results of potential strategies done as part of the feasibility study. As previously mentioned, the 2016 Draft RI/FS report identified supplementary agricultural BMPs and stream restoration/ flocculation (phosphorus inactivation) as the preferred strategies for the Upper San Marcos watershed. The 2016 Draft RI/FS report anticipates an approximate 40 percent reduction in nutrient loading to the Lake from the Upper San Marcos watershed during wet weather based on the modeling results. This reduction in nutrient loading combined with other in lake remedies (to be conducted by the Lake owner) will also reduce chlorophyll concentrations, allowing DO concentrations to remain sufficiently elevated throughout the year and allow the creeks to be supportive of the WARM beneficial use (DBSA, 2016). These anticipated reductions serve as the basis for the Upper San Marcos HA HPWQC wet weather goals. These goals along with the dry weather goals are outlined in Table 42 and Table 43.

Goals for the Upper San Marcos HA HPWQC may be revised based on pilot studies and the ongoing RI/FS process. Any updates to the interim or final goals will be included in future Carlsbad WQIP Annual Reports.

The means for achieving these goals are identified in the strategies discussion in Section 3.5.5. The strategies implemented to achieve the goals within the Upper San Marcos HA have been designed to result in load reductions for multiple pollutants, in addition to nutrients. These strategies include a variety of non-structural BMPs and a stream restoration project pilot test that “could be supplemented with a periodic chemical addition to flocculate/settle and inactivate excessive orthophosphate” (2016 Draft RI/FS report).

The City of San Marcos, City of Escondido, and the County of San Diego plan to implement a pilot stream restoration project in one of the potential areas identified in the 2016 Draft RI/FS report. The pilot study will help determine the effectiveness of the strategy to reduce flow rate and increase residence time to improve nutrient uptake in planted native vegetation concurrently with the removal of invasive species. Pending the results of the pilot test, the County of San Diego, City of San Marcos, and City of Escondido has proposed an optional strategy to implement stream restoration activities to improve the water quality of the stream and restore beneficial uses in the Upper San Marcos Creek and in turn, Lake San Marcos,

Mechanisms for measuring progress towards and ultimately achieving these goals are included in the monitoring, assessment and iterative process sections.

**Table 42: Wet Weather Interim and Final Goals for Upper San Marcos HA**

<b>Hydrologic Area: Upper San Marcos – Upper San Marcos Creek</b>			
<b>High Priority Water Quality Condition: Nutrients</b>		<b>Applicable Receiving Water(s): Upper San Marcos Creek</b>	
<b>Pollutant/Stressor: Ammonia, Nitrate, Total Nitrogen, and Total Phosphorus</b>		<b>Responsible Agencies: City of San Marcos, City of Escondido, and County of San Diego</b>	
<b>Interim Goal (2013-2018) 2018</b>	<b>Interim Goal (2018-2023) 2023</b>	<b>Interim Goal (2023-2028) 2028</b>	<b>Final Goal (2028-2033) 2033</b>
Reduce nutrient loads at key outfalls <sup>1</sup> by 0.3% or meet nutrient water quality objectives in the creek <sup>2</sup>	10% nutrient load reduction from baseline <sup>3</sup> OR meet nutrient water quality objectives <sup>4</sup> .	20% nutrient load reduction from baseline <sup>3</sup> OR meet nutrient water quality objectives <sup>4</sup> .	40% load reduction from baseline <sup>3</sup> OR meet nutrient water quality objectives <sup>4</sup> .

<sup>1</sup>The two selected key drainage areas are the wet weather storm drain outfall monitoring locations identified in the Monitoring and Assessment Plan as MS4-CAR-072 (County of San Diego outfall) and MS4-CAR-05 (City of San Marcos outfall). The selected key drainage areas are all typical drainages that are representative of the Upper San Marcos HA. The baseline flux was calculated averaging the last two years of wet weather transitional monitoring data from the two outfalls.

<sup>2</sup>Baseline: Total Nitrogen = 0.0423 lbs./acre/storm and Total Phosphorous = 0.0067 lbs./acre/storm

<sup>3</sup>Baseline: Total Phosphorous = 6,867 lbs./year and Total Nitrogen = 88,904 lbs./year. Baseline is taken from the annual load calculated in Appendix D of the 2010-2011 Receiving Waters and Urban Runoff Monitoring Report at Station SM-TWAS which is located in HA 904.52. Total Nitrogen is calculated by summing the annual loads for TKN, Nitrate and Nitrite. (TKN = 37,054 lbs./yr., Nitrate = 49,638 lbs./year, and Nitrite = 2,212 lbs./year). This baseline represents the most recent monitoring conducted at the SM-TWAS prior to the issuance of Investigative Order R9-2011-0033.

<sup>4</sup>WQO for nutrients in a creek just before it enters a standing body of water: 0.05 mg/L Total Phosphorus and 0.5 mg/L Total Nitrogen. In the future, site specific Water Quality Objectives may be developed.

**Table 43: Dry Weather Interim and Final Goals for County of San Diego and City of San Marcos in the Upper San Marcos HA<sup>1</sup>**

Interim Goal (2013-2018) 2018 <sup>2</sup>	Interim Goal (2018-2023) 2023 <sup>2</sup>	Final Goal (2023-2028) 2028 <sup>2</sup>
Effectively eliminate 10% of the anthropogenic dry weather surface runoff (excludes groundwater, other exempt or permitted non-storm water flows) from identified outfall(s) OR Effectively eliminate one persistently flowing outfall OR Discharge meets the nutrient WQO <sup>3</sup> for the applicable water body segment.	Effectively eliminate 40% of the anthropogenic dry weather surface runoff (excludes groundwater, other exempt or permitted non-storm water flows) from identified outfall(s) OR Effectively eliminate two persistently flowing outfalls OR Discharge meets the nutrient WQO <sup>3</sup> for the applicable water body segment.	Effectively eliminate 100% of the anthropogenic dry weather surface runoff (excludes groundwater, other exempt or permitted non-storm water flows) from identified outfall(s) OR Discharge meets the nutrient WQO <sup>3</sup> for the applicable water body segment.

1. The City of Escondido has not identified any major outfalls within its portion of the watershed and is therefore unable to propose similar dry weather goals.
2. Flow Reduction goals are currently based on best professional judgment as current flow data is not available. The goals may be adapted as monitoring data/information is gathered, analyzed and baselines are established.
3. WQO for nutrients: In a creek = 0.1 mg/L Total Phosphorus and 1.0 mg/L Total Nitrogen; In a creek just before it enters a standing body of water = 0.05 mg/L Total Phosphorus and 0.5 mg/L Total Nitrogen; A standing body of water = 0.025 mg/L Total Phosphorus and 0.25 mg/L Total Nitrogen;



### 3.5.4 San Marcos HA Strategies

Based on the process and information identified in Section 2.4, the RAs within the San Marcos HA identified the strategies to be implemented, or triggered for implementation, to address the HPWQC and PWQCs to the maximum extent practicable (MEP). In addition to the focus placed on the HPWQC, the RAs' strategies will be implemented within the respective RA's jurisdiction to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, and protect the beneficial uses of the receiving waters from MS4 discharges in order to achieve or maintain the interim and final numeric goals. Furthermore, in some cases, strategies include those that improve or enhance the natural beneficial watershed features: wetlands; riparian habitat; upland vegetation; and connectivity.

Table 44 identifies the Water Quality Improvement Strategies to be implemented throughout the entire San Marcos HA. The San Marcos HA HPWQCs are highlighted in yellow and the PWQCs are highlighted in green in Table 44. The WQIP strategies that are targeting the HPWQC and PWQCs are also identified in the table. The table includes planned strategies to be implemented as part of the Copermittees' core programs and additional, "optional" strategies that Copermittees will implement to target the HPWQC or PWQCs.<sup>19</sup> RAs have in many cases enhanced their jurisdictional strategies to target specific areas or sources that are causing or contributing to the HPWQC or PWQCs in the San Marcos HA. HA-specific geographic characterizations and prioritization is described in Section 3.5.4.1 and are noted in Table 44 where applicable. Additional optional strategies are also identified in Table 44. The additional optional strategies may be implemented based on a variety of triggers, such as progress made towards numeric goals. Strategies numbered 1-13 in Table 44 are described in Section 2.4 and further detailed in each RAs' JRMP. All other strategies are described in the subsections below.

As the RAs implement strategies and analyze data, it is expected that these strategies and schedules may change through an iterative and adaptive management process. The adaptive management process is presented in Section 2.5.

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<sup>19</sup> Core programs address the requirements of Permit Provisions E.2 through E.7, and their inclusion in the Water Quality Improvement Plan is discussed in Permit Section B.3.b.(1)(a). The requirements applicable to additional, "optional" strategies are discussed in Permit Provision B.3.b.(1)(b).

Table 44: San Marcos HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Conditions								Target Temporal Benefit		Implementation Schedule									
		City of Encinitas	City of San Marcos	City of Carlsbad	City of Escondido	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens (Lower SM HA)	Trash	Heavy Metals	Nutrients (Upper SM HA) (PWQC in Lower San Marcos HA)	Toxicity (Lower San Marcos HA)	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b)))																																		
1	Administrative BMPs	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•							•			•	•	•	•	•	•	•	•	•	•	
2	Investigations	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•							•			•	•	•	•	•	•	•	•	•	•	
3	Development and Redevelopment Requirements	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide						•									•			•	•	•	•	•	•	•	•	•	•	
4	Construction Site Inspections	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide				•											•			•	•	•	•	•	•	•	•	•	•	
5	Existing Development Facilities, Areas and Activities Inspections	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•		•			•								•			•	•	•	•	•	•	•	•	•	•	
6	MS4 Inspections/Cleaning	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide								•							•			•	•	•	•	•	•	•	•	•	•	
7	Street Sweeping	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide							•								•			•	•	•	•	•	•	•	•	•	•	
8	General Education and Outreach	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•									•			•	•	•	•	•	•	•	•	•	•	
9	Employee Training <sup>2</sup> /Focused Training	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•						•	•							•			•	•	•	•	•	•	•	•	•	•	
10	Enforcement	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•							•			•	•	•	•	•	•	•	•	•	•	
11	Partnership Program(s)	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•							•			•	•	•	•	•	•	•	•	•	•	
12	Program for Retrofitting Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•							•			•	•	•	•	•	•	•	•	•	•	
13	Program for Stream, Channel and/or Habitat Restoration in Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•							•			•	•	•	•	•	•	•	•	•	•	
14	Ultraviolet Bacteria Treatment Facility Operation <sup>1</sup>	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-	•	•		•	•		•	•											•	•	•	•	•	•	•	•	•	
15	Low Impact Development Residential Retrofit Outreach and Incentive Program <sup>1</sup>	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-				•	•	•												•	•		•		•	•	•	•	•	
16	Evaluate Sanitary Sewer Maintenance and Overflow Prevention	HA Wide	-	-	-	-				•	•													•	•	•		•	•	•	•	•	•	
17	Low Impact Development HOA and Property Manger Retrofit Outreach and Incentive Program <sup>1</sup>	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-				•	•	•												•	•			•	•	•	•	•	•	

Table 44: San Marcos HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources							Target Pollutant, Stressor, or Conditions							Target Temporal Benefit		Implementation Schedule											
		City of Encinitas	City of San Marcos	City of Carlsbad	City of Escondido	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens (Lower SM HA)	Trash	Heavy Metals	Nutrients (Upper SM HA) (PWQC in Lower San Marcos HA)	Toxicity (Lower San Marcos HA)	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
18	Plastic Bag Ban <sup>1</sup>	HA Wide	-	-	-	-					•					•							•	•	•		•	•	•	•	•	•	•	
19	Increased Inspection Frequency for Commercial Sources	2nd Street Sub-Basin (Lower San Marcos HA)	-	-	-	-			•		•					•	•		•				•	•	•		•	•	•	•	•	•	•	
20	El Camino Real Channel Flood Control and Water Quality Improvements	Lower San Marcos HA	-	-	-	-							•	•	•		•			•	•		•	•			•	•						
21	Permanent BMP Requirements for Standard Projects	HA Wide									•						•				•	•	•	•	•	•	•	•	•	•	•	•	•	
22	Pet Waste Bag Dispensers	HA Wide	-	-	-	-				•	•				•								•	•	•	•	•	•	•	•	•	•	•	•
23	Property-Based/Patrol Inspections	-	Upper SM HA Focus Areas	-	HA Wide	-	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•	•			•	•	•	•	•	•	•
24	Active Field Program to Identify and Address Dry Weather Flows	-	-	-	-	CAR 068, CAR 069, CAR 070, CAR 072	•	•		•	•		•		•	•	•	•		•		•	•		•			•	•	•	•	•	•	•
25	Irrigation Runoff Reduction	-	Upper SM HA Focus Areas	-	HA Wide	HA Wide	•	•		•	•		•	•	•		•		•				•	•				•	•	•	•	•	•	•
26	San Marcos & VWD Irrigation Runoff/Water Waster Program <sup>3</sup>	-	Upper SM HA Focus Areas	-	-	-	•	•	•	•	•	•		•			•					•	•		•			•	•					
27	City of San Marcos and VWD Fats, Oils and Grease Program Collaboration	-	Upper SM HA Focus Areas	-	-	-		•		•	•								•				•					•	•					
28	Enhancements to Education Program	-	Upper SM HA Focus Areas	-	HA Wide	HA Wide	•	•	•	•	•	•			•		•	•				•	•	•	•			•	•					
29	Citywide Landscape Conversion Program	-	Upper SM HA Focus Areas	-	-	-				•	•	•			•		•					•		•	•			•	•					
30	Filter Retrofit Program <sup>3</sup>	-	Upper SM HA Focus Areas	-	-	-	•						•		•		•						•	•			•	•						
31	BMP Manual Training - External	-	-	-	-	HA Wide						•			•	•	•	•		•		•	•	•	•		•	•	•	•	•	•	•	•

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Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Conditions							Target Temporal Benefit		Implementation Schedule										
		City of Encinitas	City of San Marcos	City of Carlsbad	City of Escondido	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens (Lower SM HA)	Trash	Heavy Metals	Nutrients (Upper SM HA) (PWQC in Lower San Marcos HA)	Toxicity (Lower San Marcos HA)	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
32	Promote Incentive Programs: Rain Barrel, Live Turf Replacement & Outdoor Water Efficiency <sup>3</sup>	-	-	-	HA Wide	HA Wide	•	•		•	•		•		•	•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	
34	HOA and Property Manager Outreach Program	-	Upper SM HA Focus Area	-	-	-			•	•	•	•			•	•	•	•	•	•	•	•	•	•						•				
35	Implement Preferred Watershed Remedy as Proposed Through the Draft RI/FS	-	Upper SM HA Focus Area	-	Upper SM HA	Upper SM HA	•	•		•	•		•		•	•	•	•		•	•	•	•	•						•				
36	Implement San Marcos Creek District 401 Water Quality Certification No. 11C058	-	Upper SM HA Focus Area – Basin A	-	-	-	•	•		•	•		•		•	•		•		•	•	•	•	•						•				
37	Promote Incentive Program for BMP Retrofit	-	-	-	-	HA Wide	•	•		•	•		•		•	•	•	•		•	•	•	•	•						•				
38	Annual Focused Training for County Field Staff	-	-	-	-	HA Wide	•						•	•	•	•		•		•	•	•	•	•		•			•	•	•	•	•	•
39	Closure and Land Use Designation Change for Golf Course				Upper SM HA			•		•		•			•	•		•		•	•	•	•	•					•	•	•	•	•	•
ADDITIONAL OPTIONAL STRATEGIES (PERMIT SECTION B.3.b. (1) (b)) (more information on these strategies and criteria for initiating them can be found in Section 3.5.5.2.2)																																		
40	Ultraviolet Bacteria Treatment Facility Wet Season Operation	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-	•			•	•		•	•	•	•		•		•	•	•	•	•			Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
41	Expanded Polystyrene Ban	HA Wide	-	-	-	-	•	•		•	•				•	•		•	•	•	•			•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								
42	Highway 101 Green Street Retrofit	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-					•	•	•		•	•	•	•	•	•	•	•	•	•		Funding for design has been acquired. See Section 3.5.5.2.2 for details on criteria to initiate construction.								
43	Sylvia Street and 4 <sup>th</sup> Street Green Street Retrofit	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-				•	•	•	•		•	•	•	•		•	•	•	•	•		Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								

Table 44: San Marcos HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Conditions								Target Temporal Benefit		Implementation Schedule								
		City of Encinitas	City of San Marcos	City of Carlsbad	City of Escondido	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens (Lower SM HA)	Trash	Heavy Metals	Nutrients (Upper SM HA) (PWQC in Lower San Marcos HA)	Toxicity (Lower San Marcos HA)	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)
44	Ocean View Avenue Green Street Retrofit	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-				•	•	•	•		•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
45	Arden Drive and San Dieguito Drive Green Street Retrofit	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-				•	•	•	•		•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
46	Encinitas Viewpoint Park Green Parcel Retrofit	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-	•				•	•	•		•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
47	City Public Works Yard Green Parcel Retrofit	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-	•					•	•		•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
48	Vulcan Avenue Low Impact Development and Flood Control Project	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-				•		•	•	•	•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
49	Leucadia Highway 101 East Side Parking Areas and Storm Water Treatment	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-						•	•	•	•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
50	Leucadia Highway 101 Streetscape (Phases 1 and II)	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-						•	•	•	•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
51	Lumberyard Sidewalk (East Side Highway 101 Downtown)	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-						•	•	•	•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							
52	Coastal Rail Trail	Cottonwood Creek Basin (Lower San Marcos HA)	-	-	-	-						•	•	•	•	•	•	•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)							



Table 44: San Marcos HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Conditions								Target Temporal Benefit		Implementation Schedule									
		City of Encinitas	City of San Marcos	City of Carlsbad	City of Escondido	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens (Lower SM HA)	Trash	Heavy Metals	Nutrients (Upper SM HA) (PWQC in Lower San Marcos HA)	Toxicity (Lower San Marcos HA)	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Conditions	Dry Weather Conditions	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
53	Develop and Administer an Alternative Compliance Program to Onsite Structural BMP implementation	HA Wide	HA Wide	-	HA Wide	HA Wide			•		•				•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
54	Implement Structural or Retrofit BMPs	-	HA Wide	-	-	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
55	Assessment of agricultural operations within City jurisdiction/ active engagement as needed				HA Wide						•				•	•		•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)										
56	Implement Sustainable Landscapes Program to encourage landscape retrofits	-	-	-	-	HA Wide		•		•	•				•	•		•			•	•		•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
57	Divert persistent dry weather flows from storm drains to sewer	-	-	-	-	HA Wide								•	•		•	•	•	•	•	•		•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
58	Implement Stream Restoration Activities	-	HA Wide	-	HA Wide	HA Wide							•	•	•	•		•			•	•		•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
59	Implement a program to remove invasive non-native plants upstream areas, rivers, or tributaries	-	-	-	-	HA Wide					•	•		•				•			•	•		•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
WATERSHED MANAGEMENT AREA STRATEGIES (PERMIT SECTION B.3.b. (2))																																		
60	Integrated Regional Watershed Management(IRWM)	WMA wide	WMA wide	WMA wide	WMA wide	WMA wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating									
61	Sustainable Landscape Incentive Program	WMA wide	WMA wide	WMA wide	WMA wide	WMA wide	•	•		•					•			•	•			•	•		Based on appropriate criteria for initiating									

1 Optional Strategies. Note that where optional strategies are listed under the Planned Jurisdictional Strategies category, RAs have committed to implementing them, so no additional detail on circumstances that would trigger those optional strategies is necessary.

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### 3.5.4.1 Geographic Characteristics and Prioritization

Focusing program efforts in specific geographic areas to address known or suspected sources of discharges and pollutants are expected to improve the effectiveness of the strategies and activities.

Based on the RAs review of the characteristics of the San Marcos HA, several areas of focus were selected for concentrated program efforts. Focus areas were selected based on identified sources that are associated with contributing to the HPWQC and PWQCs, outfall data collected by RAs, and other identified characteristics that support the areas as priority areas. The focus areas in the Lower San Marcos HA include the Cottonwood Creek Basin, which drains to Moonlight Beach, and Second Street Sub-Basin, which is within the Cottonwood Creek Drainage Area.

#### 3.5.4.1.1 Lower San Marcos HA

The Cottonwood Creek Basin is located in the lower San Marcos HA. The City of Encinitas has identified this drainage area and a sub-area within the basin, the 2<sup>nd</sup> Street Sub-Basin, to focus additional strategies. This area was selected based review of identified sources that are associated with the HPWQC and PWQCs and outfall information. Both focus areas are completely within the City of Encinitas jurisdictional boundaries and have primarily residential and commercial land uses. Homes, commercial buildings, apartment complexes, nurseries, common areas and recreational park areas that include landscaping and turf are present in these focus areas and are known types of contributors to non-storm water discharges and, in turn, bacterial loading. The focus areas are shown in Figure 35.

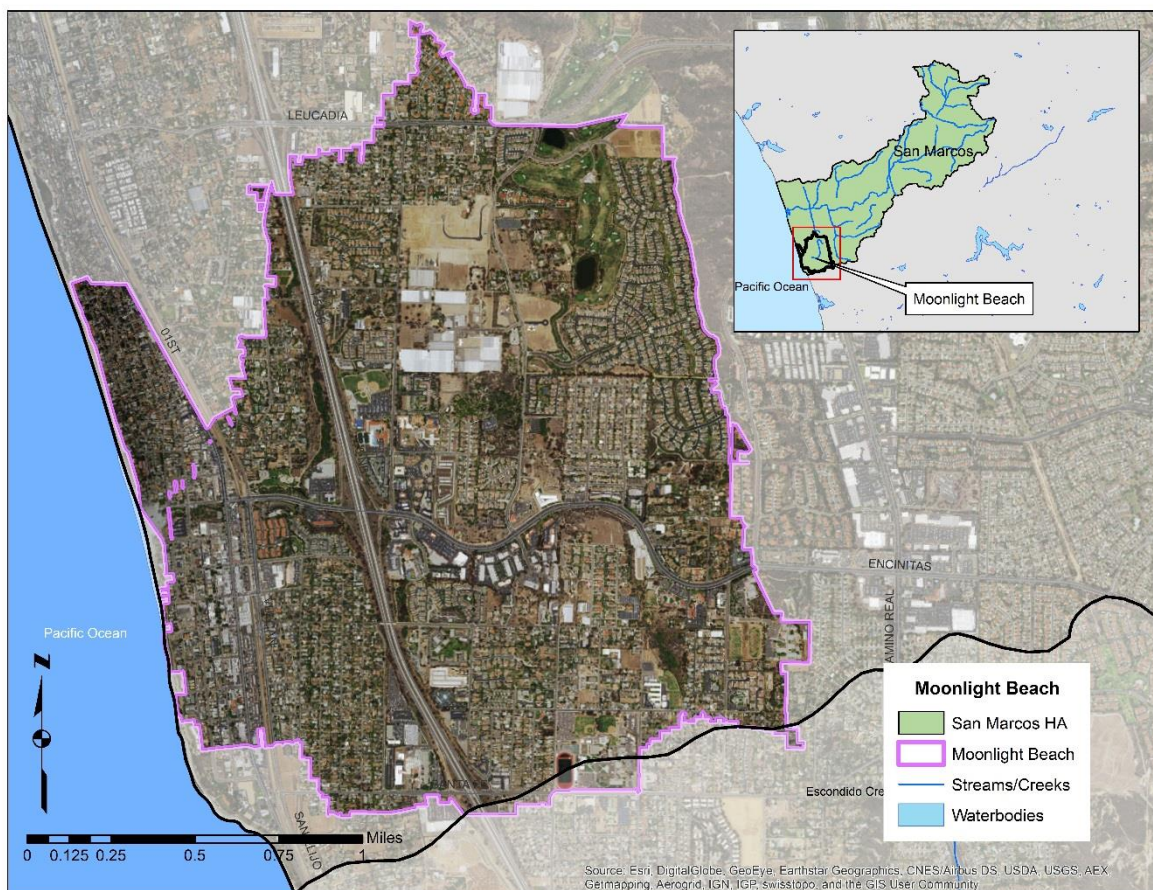


Figure 35: Cottonwood Creek and 2nd Street Drainage Areas

Encinitas will implement required core program strategies within the focus areas and throughout the City. In addition to the required core jurisdictional strategies, the City of Encinitas will implement enhanced core strategies and planned optional strategies. Further, in addition to optional strategies already scheduled for implementation, the City has identified trigger-based optional strategies (included in Section 3.5.4.2.2) to be implemented in response to specific conditions or benchmarks.

The discussion below summarizes the enhanced jurisdictional strategies and optional strategies that are planned for implementation in the focus areas to address the sources of pollutants and discharges. The identified strategies described below will be implemented within the City of Encinitas's focus areas and are intended to reduce discharges of both bacteria and other pollutants. The strategies listed below will be initiated after approval of this WQIP and are expected to meet the final numeric goals within the proposed schedule. Additional optional strategies that may be implemented, along with more detail about the circumstances in which they would be implemented, are described following the discussion of planned strategies.

The identified strategies will address multiple pollutants during both dry and wet weather conditions. Wet weather reductions will be achieved through LID implementation and nonstructural BMPs. The main approach to reducing dry weather impacts is anthropogenic dry weather flow elimination, which eliminates MS4 discharges of bacteria and other pollutants. Dry weather flow elimination has the following benefits:

- 1) 100 percent dry weather load reduction for all other pollutants;
- 2) Reduction of accumulated biofilm in the MS4 (due to lack of water) and therefore, reduction of indicator bacteria regrowth; and
- 3) Reduction of wet-weather contribution to indicator bacteria from scoured biofilm under higher velocity flows from storm discharges.

#### 3.5.4.1.2 Upper San Marcos HA

##### *City of San Marcos –San Marcos HA Focus Areas*

The San Marcos HA extends into the center portion of the City of San Marcos near the upper portion of the HA. Within the City of San Marcos there are four sub-basins that are a part of the San Marcos HA. The basins have a mixture of commercial, industrial, single-family residential, and multi-family land uses.

The City of San Marcos has identified all four sub-basins as their focus areas and they are identified as Drainage Basins A, B, C, and D. These focus areas are considered a higher threat to water quality due to the fact that all four sub-basins drain through Upper San Marcos Creek or its tributaries to Lake San Marcos. Also, each sub-basin has a variety of different land uses, activities, and sources that contribute to the nutrient impairments identified for this portion of the San Marcos HA. These focus areas were identified to specifically address the HPWQC of nutrients in the Uppers San Marcos Creek watershed. The focus areas are shown in Figure 36, Figure 37, Figure 38, and Figure 39.



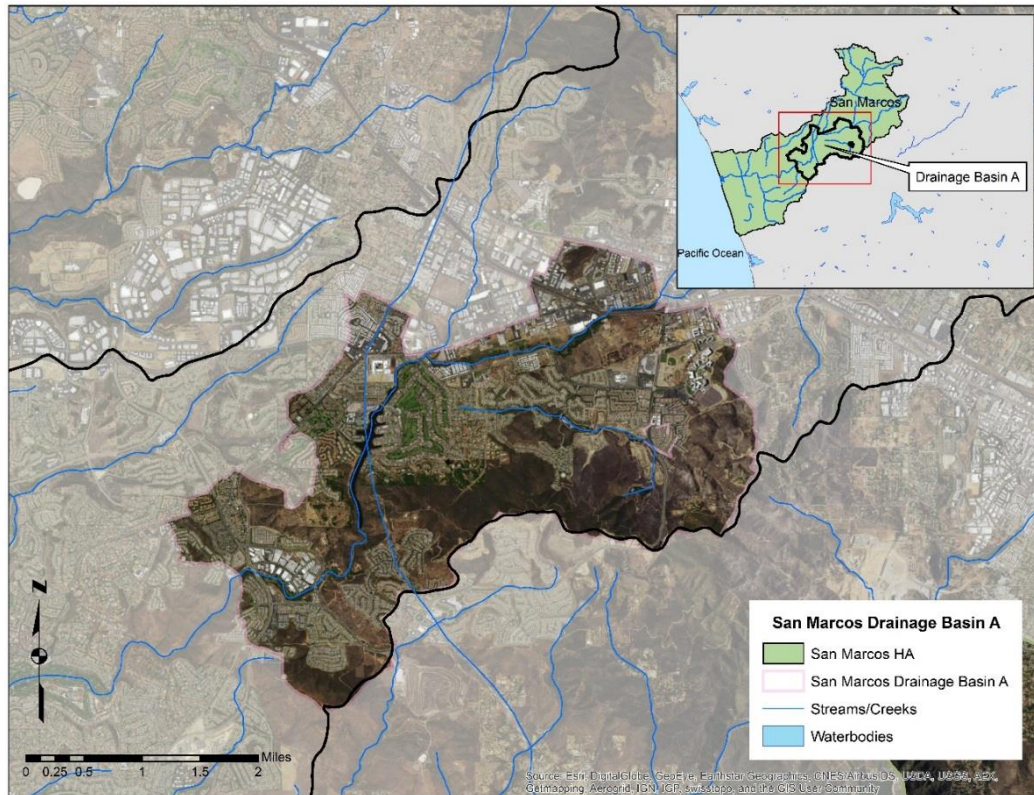


Figure 36: San Marcos Drainage Basin A

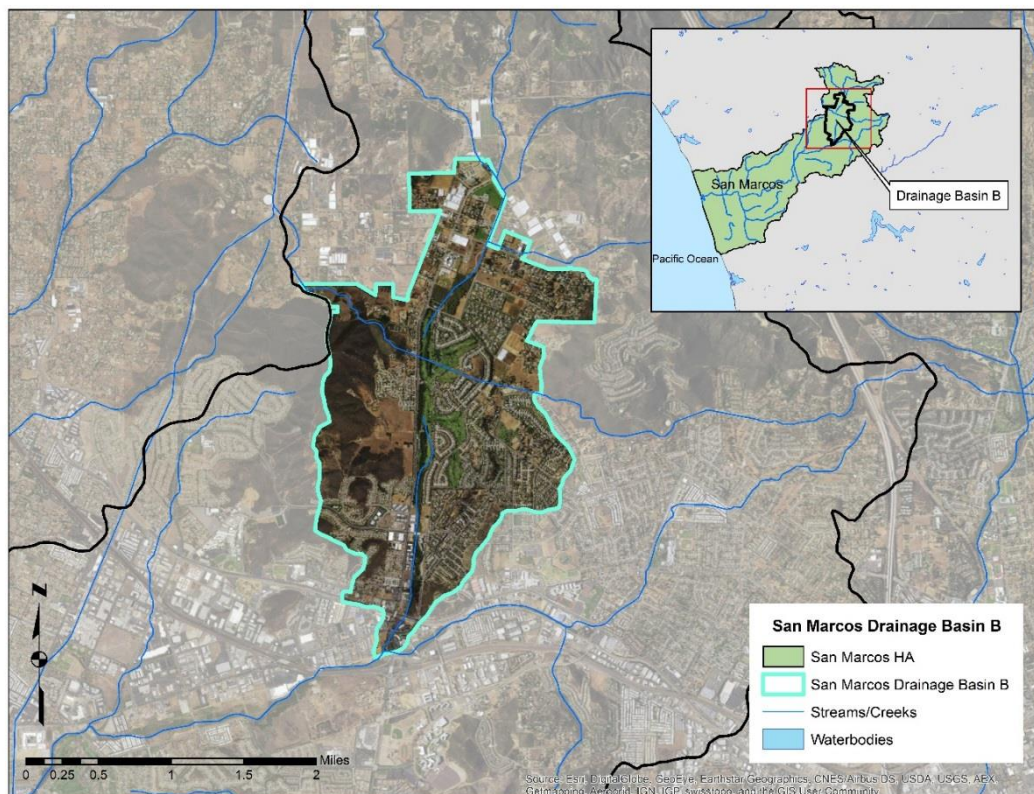


Figure 37: San Marcos Drainage Basin B



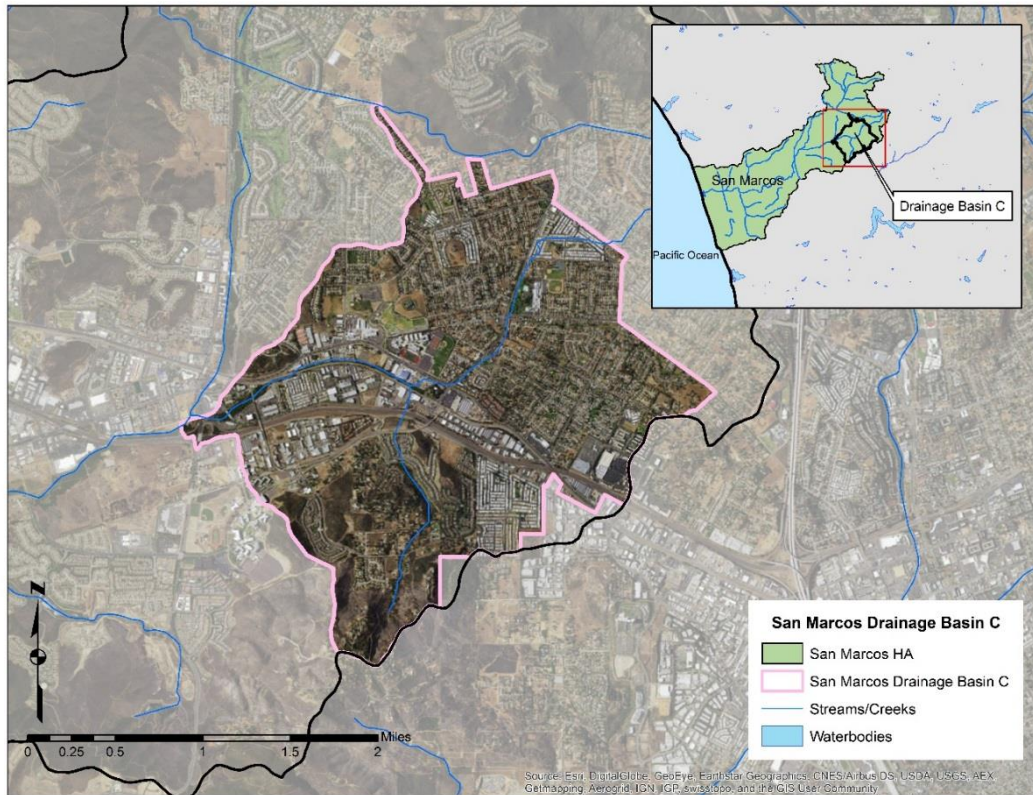


Figure 38: San Marcos Drainage Basin C

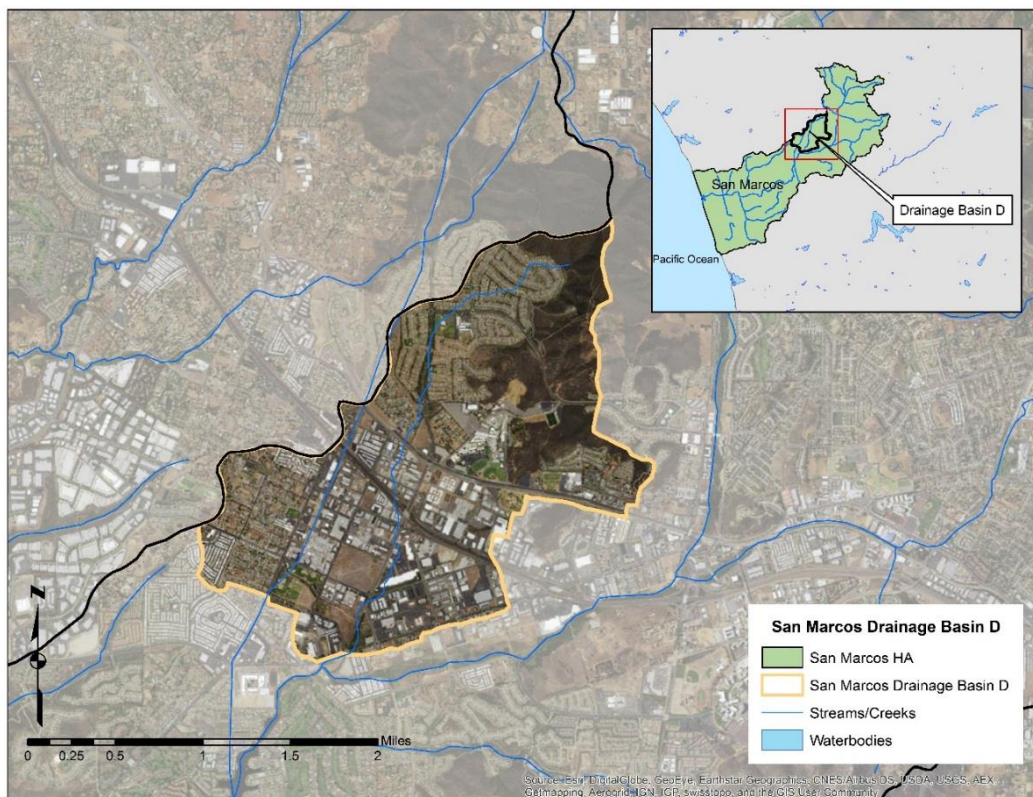
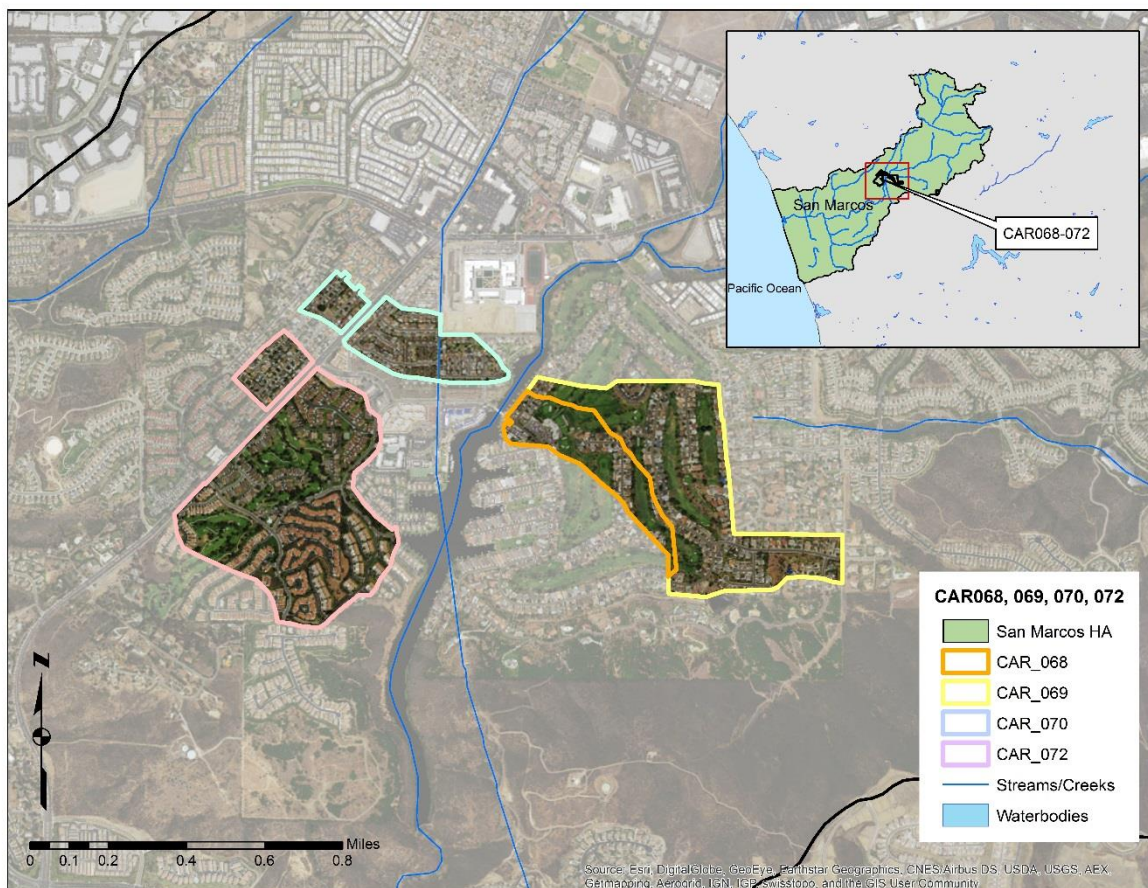


Figure 39: San Marcos Drainage Basin D



### *County of San Diego –San Marcos HA Focus Areas*

Four of the County of San Diego’s (County) major storm drain outfalls in the San Marcos HA have persistent flows and are tributary to Lake San Marcos. The unincorporated area that makes up the four drainage areas are all in the upper portion of the HA and have a range of land use types (residential, residential with some agriculture, commercial businesses, roads, etc.), which includes activities with likely potential for pollutant source loading. The focus areas are shown in Figure 40.



**Figure 40: County of San Diego San Marcos HA Focus Areas**

### *City of Escondido – San Marcos HA Focus Areas*

The City of Escondido has not identified any outfalls that would meet the definition of a major outfall within the permit. Therefore, no Focus Areas were identified for the City of Escondido within the San Marcos Creek drainage, as the City will be focusing on major outfalls with persistent flow within the Escondido Creek hydrologic area. Staff anticipates that goal reductions will likely be accomplished through other HA-wide strategies and opportunities for retrofit, particularly as part of redevelopment.

#### *3.5.4.2 San Marcos HA Strategy Description*

The following sections describe the planned jurisdictional and planned optional strategies, additional optional strategies, and watershed management area strategies to be implemented within the San Marcos HA.

##### *3.5.4.2.1 Planned Jurisdictional Strategies and Planned Optional Strategies*

The planned jurisdictional and planned optional strategies to be implemented within the San Marcos HA are described below. These strategies include the core jurisdictional program elements (Permit

Provisions, E.2. through E.7.)<sup>20</sup> described in Section 2.4.2 of this WQIP, enhancements of the core jurisdictional program elements, and optional strategies that are planned for implementation. Optional strategies that are already planned for implementation do not include additional detail on circumstances that would trigger implementation or funding and resources.

#### Strategy 14 (Table 44) - Ultraviolet Bacteria Treatment Facility Operation

<b>Jurisdiction/Area for Implementation:</b> City of Encinitas: Cottonwood Creek Basin		
<b>Target Sources:</b> Municipal Fixed Facilities; Residential; Industrial & Commercial; General Public; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> <i>Bacteria/Pathogens</i>	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

##### Strategy Description:

Encinitas has operated an UV treatment system just upstream of Cottonwood Creek since 2005. Encinitas will continue to operate and maintain the treatment facility during dry weather conditions. The system effectively eliminates 99% of the indicator bacteria passing through the system.

#### Strategy 15 (Table 44) - Low Impact Development Residential Outreach and Incentive Program

<b>Jurisdiction/Area for Implementation:</b> City of Encinitas: Cottonwood Creek Basin; County of San Diego: HA Wide		
<b>Target Sources:</b> Residential; General Public; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

##### Strategy Description:

To further the public's understanding and knowledge of LID as an effective mechanism for water conservation, incentives will be promoted through the program and via partnerships with the San Dieguito Water District and the Olivenhain Municipal Water District. Incentives include rebates for turf removal and installation of drip irrigation, both of which reduce overall water use and irrigation runoff. Other incentives may include rebates for construction of small-scale structural LID features. Complimentary water use evaluations will also be made available in addition to rebates to promote water conservation. The program also includes partnering with residents within the target area to implement small-scale LID features on their property to serve as demonstration projects for planned neighborhood workshops. The City will also organize and put on workshops in coordination with residents, offering a tour of the retrofitted property open to other homeowners in the area. Through this hands-on workshop, homeowners will get ideas for retrofits they could implement at their own properties, learn how to install LID retrofits, and ask questions of LID and water conservation experts.

The initial stage of this strategy has focused on the neighborhoods along Pacific View Lane and Sea View Court within the Cottonwood Creek Drainage Basin. This neighborhood was targeted due to observed presence of irrigation runoff. Based on lessons learned from the pilot project, Encinitas is expanding the program to cover additional neighborhoods within the Cottonwood Creek Drainage Area.

#### Strategy 16 (Table 44) - Evaluate Sanitary Sewer Maintenance and Overflow Prevention

<b>Jurisdiction/Area for Implementation:</b> City of Encinitas: Cottonwood Creek Basin; County of San Diego: HA Wide		
<b>Target Sources:</b> Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

##### Strategy Description:

Encinitas will evaluate sewer system maintenance frequencies and FOG program policies, including procedures targeted at private laterals, to protect the Moonlight Beach Shoreline. While Encinitas has not had Sanitary Sewer

<sup>20</sup> Core jurisdictional program elements (Strategies 1-13 in Table 16) are described in Section 2.4.2 of this WQIP and are not summarized in this section.

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Overflows (SSO)s recently, evaluating Encinitas's Sanitary Sewer Maintenance Plan is important as a proactive step. Based on the findings of the evaluation, Encinitas may make modifications to its maintenance program to prevent SSOs, such as increasing maintenance frequency for targeted portions of the sanitary sewer collection system. Eliminating SSOs prevents the introduction of bacteria, nutrients, and other pollutants to Moonlight Beach and Cottonwood Creek

**Strategy 17 (Table 44) - Low Impact Development HOA and Property Manager Retrofit Outreach**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin; County of San Diego: HA Wide

<b>Target Sources:</b> Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Encinitas will evaluate sewer system maintenance frequencies and FOG program policies, including procedures targeted at private laterals, to protect the Moonlight Beach Shoreline. While Encinitas has not had SSOs recently, evaluating Encinitas's Sanitary Sewer Maintenance Plan is important as a proactive step. Based on the findings of the evaluation, Encinitas may make modifications to its maintenance program to prevent SSOs, such as increasing maintenance frequency for targeted portions of the sanitary sewer collection system. Eliminating SSOs prevents the introduction of bacteria, nutrients, and other pollutants to Moonlight Beach and Cottonwood Creek.

**Strategy 18 (Table 44) - Plastic Bag Ban**

**Jurisdiction/Area for Implementation:** City of Encinitas: HA Wide

<b>Target Sources:</b> General Public; Commercial	<b>Target Stressors/Pollutants/Conditions:</b> Trash	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Encinitas recently passed an ordinance banning distribution of single use plastic bags throughout the City. The ordinance is a true source control approach to eliminating trash; true source control eliminates the initial introduction of pollutants to the environment and is therefore widely recognized as among the most effective and efficient methods to reduce pollution. The ban applies to large retailers, grocery stores, drug stores, convenience stores, and mini-markets in spring 2015 and to farmer's markets and all other retailers in fall 2015. Removing trash from the MS4 is expected to reduce bacteria by preventing the introduction of food wastes and similar materials sometimes found in plastic bags and also by reducing in-MS4 habitat for bacteria regrowth. The ban, along with the proposed ban on expanded polystyrene products (see Table 20) is also expected to help the City comply with the upcoming requirements of the State Trash Amendments. The requirements of the ordinance will be implemented on an ongoing basis.

**Strategy 19 (Table 44) - Increased Inspection Frequency for Commercial Sources**

**Jurisdiction/Area for Implementation:** City of Encinitas: 2<sup>nd</sup> Street Sub Basin

<b>Target Sources:</b> Commercial	<b>Target Stressors/Pollutants/Conditions:</b> Trash; Heavy Metals; Oil and Grease	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

All inventoried commercial businesses in the 2<sup>nd</sup> Street sub-basin will be inspected twice per year. This is 10 times more than the minimum commercial inspection requirements mandated in the Municipal Permit. Most businesses in the 2<sup>nd</sup> Street sub-basin are restaurants, and inspections will focus on evaluating compliance with bacteria-control BMPs, such as keeping used cooking oil storage containers in covered, contained areas, proper disposal of food waste, keeping dumpster lids closed, and proper disposal of cleaning water. Where BMP deficiencies are noted, the City will require corrections to be made and will take enforcement as needed, in accordance with the City's Enforcement Response Plan.

### Strategy 20 (Table 44) - El Camino Real Channel Flood Control and Water Quality Improvements

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

<b>Target Sources:</b> Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Nutrients; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

This project involves the removal of 3-feet of sediment build up in El Camino Real Channel/Encinitas Creek underneath the bridge on Leucadia Blvd just west of El Camino Real. The project includes the construction of a detention basin to prevent sediment from discharging into Batiquitos Lagoon. Invasive plants will also be removed and replaced with native trees and vegetation within the riparian area to further improve water quality. Funding in the amount of \$1,580,827 has been appropriated to the project and will cover design and construction. Portions of these funds are coming from a Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant (\$830,430) and a County Vector Control Grant (\$500,000). Design has been completed, the project has gone to bid, and is currently under construction. Construction is scheduled to be completed by April 2016.

### Strategy 21 (Table 44) - Permanent BMP Requirements for Standard Projects

**Jurisdiction/Area for Implementation:** City of Encinitas: Lower San Marcos HA

<b>Target Sources:</b> Land Development & Redevelopment; Residential; Commercial and Industrial	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Nutrients; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

The City of Encinitas BMP Design Manual became effective in February 16, 2016 and establishes source control, site design and structural BMP requirements for proposed development and redevelopment projects. The manual outlines requirements for three tiers of projects: Priority, Standard and Basic. In addition to the minimum source control and site design requirements, Standard Projects within the City of Encinitas must also install structural BMPs based on the following sizing criteria: Minimum BMP Area = 0.03 Σ (Surface Type SF X Surface Type Runoff Factor). This requirement goes above the Permit requirements for development projects and adds a significant number of additional BMPs throughout the City. Each of these BMPs will help to capture, infiltrate and reduce pollutant loading to downstream water bodies.

### Strategy 22 (Table 44) – Pet Waste Bag Dispensers

**Jurisdiction/Area for Implementation:** City of Encinitas: Lower San Marcos HA

<b>Target Sources:</b> Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Pet waste bags are currently dispensed throughout the City's parks, trails and beaches. Approximately 600,000 pet waste bags are utilized annually. Providing resources to collect pet waste helps to reduce potential bacteria sources.

### Strategy 23 (Table 44) - Property-Based Inspections/Patrol

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Areas

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Trash; Heavy Metals; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

The objective of this program is to reduce discharges to the MS4 and provide inspection of existing development in a more cost efficient and effective manner. The inspections are expected to result in the elimination of dry



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weather flows, but will also affect the wet weather loading potential and provide opportunities for identification of potential retrofit projects. Features include:

- Developing patrol and inspection protocols
- Developing and conducting staff training
- Conducting property-based/patrol inspections
  - Performing patrols/inspections a minimum of twice per year in this focus area
  - Performing onsite patrols/inspections of each property in the focus area
  - Identification of active dry weather discharges and evidence of historical discharges
  - Identification of pollutant generating activities and areas that may contribute wet weather storm water pollutant loading, and
- Performing follow-up with property owner/manager on identified issues to resolve discharges and/or potential pollutant discharges.
- Conducting property-based/patrol inspections (City of Escondido)
  - Performing patrols/inspections in industrial/commercial areas outside of the City of Escondido Water Service Area (includes San Marcos Creek Watershed) at least once per year.
  - Performing onsite patrols/inspections of each resident property in the focus area during one permit cycle
  - Identification of active dry weather discharges and evidence of historical discharges
  - Identification of pollutant generating activities and areas that may contribute dry and/or wet weather storm water pollutant loading, and
- Performing follow-up with property owner/manager on identified issues to resolve discharges and/or potential pollutant discharges.

The City of San Marcos will perform these property-based/patrol inspections multiple times per year at various times of the day to capture irrigation runoff and other non-authorized discharges as well as identify BMP issues.

**Strategy 24 (Table 44) - Active Field Program to Identify and Address Dry Weather Flows**

**Jurisdiction/Area for Implementation:** County of San Diego: CAR 068, CAR069, CAR070, and CAR072

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The focused area was selected based on strategic assessments, including nutrients, review of 303(d) listings, monitoring data, and persistent flows. Field staff will conduct ongoing surveillance and may employ various tools to reduce nutrient pollutant loads and non-storm water flows, including outreach efforts such as over-irrigation focus, pet waste, HOA, and landscaper outreach. New outreach materials will be developed for use in focused inspections. Priority sources of nutrients, bacteria, and other pollutants will be targeted for education and outreach, including residential areas, nurseries/greenhouses, and eating/drinking establishments.

**Strategy 25 (Table 44) - Irrigation Runoff Reduction Program**

**Jurisdiction/Area for Implementation:** City of Escondido: HA Wide; City of San Marcos: Upper San Marcos HA Focus Areas; County of San Diego: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Heavy Metals; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The objective of the IRRP is to eliminate or reduce dry weather flow contributions, concurrent with the final goals, coming from irrigation runoff, regardless of the time of day the discharges occur. Reducing or eliminating runoff

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from irrigation will reduce non-storm water flows thereby reducing nutrient and bacterial contributions (as well as other pollutants) in both dry weather and wet weather scenarios. An irrigation runoff program is expected to target such pollutants as heavy metals, oil and grease, sediment, and pesticides, in addition to nutrients and bacteria. Core elements include:

- Developing municipal codes that prohibit irrigation runoff
  - Developing educational materials and outreach program specific towards irrigation runoff
  - Assessing dry weather flows at outfall(s)
  - Identifying key times to perform site observations
  - Perform site observations to identify sources of irrigation runoff
  - Collaboration with the City of San Marcos Public Works Department or City of Escondido Public Works Department, as appropriate, to address municipal property irrigation systems
  - Initiating contact and correspondence with property managers/owners
  - Periodically assessing flows, and
  - Optionally developing and implementing an incentive program to encourage the elimination of irrigation runoff.

**Strategy 26 (Table 44) - City of San Marcos & Vallecitos Water District (VWD) Irrigation Runoff/Water Waster Program**

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Areas

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Land Development & Redevelopment; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Heavy Metals; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

- The City of San Marcos and VWD staff collaborate and communicate regularly to share information regarding reports and complaints
- Public water waster reporting is available on both the City of San Marcos and VWD websites
- The City of San Marcos utilizes VWD developed door hangers for City field staff to distribute if water wasting is reported or observed at a property
- The City of San Marcos developed template response letters identifying both the City of San Marcos and VWD program requirements, and
- This program will be implemented in conjunction with the proposed irrigation runoff reduction program strategy.

**Strategy 27 (Table 44) - City of San Marcos & VWD Fats, Oils, and Grease (FOG) Program Collaboration**

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Areas

<b>Target Sources:</b> Industrial and Commercial Facilities; Residential; General Public; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

- Continue coordination between the City of San Marcos and VWD programs. The City of San Marcos anticipates a collaborative work effort between the City of San Marcos' inspection program and VWD's FOG program in order to reduce sewer backups and overflows that result from accumulation of FOG in the sewer system
- VWD established an Ordinance to regulate FOG
- VWD visited all of the Food Service Establishments (FSEs) within the City of San Marcos to provide an overview of the program and expectations

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- VWD created a guidance manual provided to each FSE that includes BMP information, maintenance requirements, and record keeping documents. The City of San Marcos is prepared to utilize these documents during independent inspections or investigations
- VWD will inspect all FSEs at least once a year and collaborate with the City of San Marcos to perform dual inspections when needed, and
- Inspection results for both parties will be shared regularly to better identify problem areas more efficiently and to coordinate effective corrective actions.

**Strategy 28 (Table 44)– Enhancements to Education Program**

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Areas; County of San Diego: HA Wide; City of Escondido: HA wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Land Development & Redevelopment;	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Nutrients and other priority pollutant specific education and outreach program to be conducted in the Upper San Marcos HA Focus Areas for target sources identified above. The materials will focus on results obtained through the various program components such as property based inspections and will have an emphasis on discharges to the City of San Marcos’ MS4 and the receiving water impacts.

Developing and implementing a training/seminar for property managers and others that have direct responsibility for common areas within HOAs and commercial properties. Educational materials and information will be developed and provided to the managers for them to distribute to their residents and tenants.

As part of the residential outreach program, the City of San Marcos will work with residents and property owners to educate through various means, which may include the use of the City’s website, social medial platforms, and published community newsletters, school programs, collaborative workshops, block parties, volunteer events, and one-on-one meetings.

The County will continue to sponsor workshops for specific target audiences and pollutants of concern, including manure management and composting for horse owners (targeting animal facilities); integrated pest management and gardening workshops for residents interested in gardening and more sustainable landscape practices; and rain water harvesting classes to encourage capturing rain from roofs for landscape use.

The City of Escondido provides an enhanced education program through a dedicated staff member who does outreach on storm water and water conservation issues at schools (“The Water Lady.”) Presentations are provided to elementary-aged school children on topics consistent with the Common Core Standards. The City supplements this with the provision of “Splash Lab” visits, field trips and presentations to Junior High and High school classes as requested. Outreach to adults includes the provision of landscaping workshops and online resources for residents interested in converting their gardens to California-friendly gardens. An annual landscaping competition is organized to acknowledge the accomplishments of those who have installed California-friendly gardens and to raise awareness of the overall issue. City staff also provide education at community events, at neighborhood group meetings, special interest groups (i.e., Kiwanis) and community education events (e.g., library seminars). Education is also provided as needed in response to observations made during residential management area inspections and will be tailored specifically to the need (in person conversation, provision of brochures, presentations to community groups and HOAs). These in-person interactions are supplemented by our City webpage and Facebook page

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The County of San Diego completed County baseline survey of registered voters in the unincorporated area to establish a reference point for the knowledge and awareness of residents. During educational workshops, pre and post surveying will be conducted to assess the effectiveness of programs reaching attendees. These will measure improvement in knowledge, awareness, and likelihood of changing behaviors to be less polluting, particularly in residential areas. Survey results will be assessed on an annual basis.

**Strategy 29 (Table 44) - Citywide Landscape Conversion Program**

<b>Jurisdiction/Area for Implementation:</b> City of San Marcos: Upper San Marcos HA Focus Areas		
<b>Target Sources:</b> Residential; General Public; Land Development & Redevelopment;	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

Following the approach of the recently completed City of San Marcos Civic Center Landscape Demonstration Project, the City will implement similar conversions to several medians and other public maintained areas throughout the City and within the Upper San Marcos Creek Watershed. This program will include landscape renovation from mainly turf grass to native drought tolerant plants/turf and irrigation systems will be upgraded for better efficiency and to reduce or eliminate irrigation runoff.

**Strategy 30 (Table 44) – Filter Retrofit Program**

<b>Jurisdiction/Area for Implementation:</b> City of San Marcos: Upper San Marcos HA Focus Area		
<b>Target Sources:</b> Municipal Fixed Facilities; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Oil and Grease;	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

The City of San Marcos will continue to implement the filter upgrade program provided through an existing grant program. Aging filters located within public facilities in need of repair are retrofitted with new proprietary filters systems that contain media filters to treat dissolvable pollutants including nutrients and bacteria.

**Strategy 31 (Table 44) - BMP Manual Training - External**

<b>Jurisdiction/Area for Implementation:</b> County of San Diego: HA Wide		
<b>Target Sources:</b> Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

The BMP Manual for new and redevelopment will be updated in FY16 and training/outreach will be provided to County staff followed by the development industry. One-time land development workshops will be held to educate the development community on updated requirements, particularly as they pertain to priority sources of bacteria, nutrients, and other pollutants, such as residential areas and commercial areas including nurseries/greenhouses and eating/drinking establishments.

**Strategy 32 (Table 44) – Promote Incentive Programs: Rain Barrel, Live Turf Replacement & Outdoor Water Efficiency**

<b>Jurisdiction/Area for Implementation:</b> City of Escondido HA-Wide; County of San Diego HA-Wide		
<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Roads and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Nutrients; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

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**Strategy Description:**

The County sponsored program is a public-private partnership to promote cost-effective water conservation practices in outdoor areas. The Incentive Program offers incentives for rain barrel installation, downspout disconnects from the storm water system, and live turf replacements. Implementation of this strategy will be triggered if (1) an interim goal has not been met, and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary, and (3) pilot program success; and (4) all of the necessary resources have been secured. BMP retrofits will target sources of wet and dry weather flows that can mobilize nutrient and bacteria, particularly associated with residential areas as well as roads, streets, and parking.

The City of Escondido is already implementing similar programs through partnerships with MWD and SDCWA and will continue to do so.

**Strategy 33 (Table 49) - Enhanced FOG Inspection Program**

**Jurisdiction/Area for Implementation:** City of Escondido: HA Wide

<b>Target Sources:</b> Industrial and Commercial Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Oil and Grease	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Escondido's FOG inspection program addresses businesses with grease traps or separators, including restaurants, automotive repair facilities, and others. As operator of a Publicly Owned Treatment Works (POTW), Escondido implements an enhanced inspection schedule city-wide, inspecting restaurants on average more than once each year. This enhanced inspection program mitigates the potential causes for sewer overflows, and also address storm water BMPs.

**Strategy 34 (Table 44) – HOA and Property Manager Outreach Program**

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Areas

<b>Target Sources:</b> Construction Sites; Residential; General Public; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Trash; Heavy Metals; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of San Marcos will implement an education and outreach program that encourages and/or incentivizes Home Owner Associations and business property managers to reduce dry weather and/or wet weather flows leaving their properties. Practices could include proper installation and maintenance of irrigation systems, conversion to drought tolerant landscaping, downspout disconnections, LID retrofits, etc.

**Strategy 35 (Table 44) – Implement Preferred Watershed Remedy as Proposed Through the Draft RI/FS**

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Areas; County of San Diego: Upper San Marcos Creek Watershed; City of Escondido: Upper San Marcos Creek Watershed

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Bacteria/Pathogens; Trash; Heavy Metals; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Based on the Draft RI/FS, the selected preferred remedy for the Upper San Marcos Creek Watershed consists of supplementary agricultural BMPs (to be implemented through the proposed Agricultural WDR) and stream restoration/flocculation (phosphorous inactivation).



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Agricultural BMPs consist of installing supplemental buffer strips, conducting or maintaining watershed-wide facility inspections for appropriate managerial practices (manure/fertilizer management), and implementing an agricultural irrigation optimization/reduction program.

City of San Marcos, City of Escondido, and County of San Diego will collaborate on efforts to restore San Marcos Creek in coming years to address nutrient loading in the creek. A pilot stream restoration project will be designed to reduce nutrient loading in the creek as described in the Draft RI/FS and is expected to have supplemental reductions to bacteria and sediment. A pilot study will be conducted to determine efficacy of stream restoration to reduce nutrients in one of the potential areas identified in the Draft RI/FS. The RAs anticipate conducting the pilot study within the next five years dependent on RI/FS process and RWQCB input. Once a detailed schedule is established, the RAs will include updates on the pilot study in each WQIP Annual Report.

The stream restoration/flocculation remedy include the following proposed options as funds are available pending on approval of environmental documents, obtaining permits, and the feasibility of effectiveness based on the results of the pilot study:

- Widening or modifying the impaired creek channel to disperse and slow flow to increase residence time and nutrient uptake.
- Re-sloping streambanks to reduce erosion and Total Suspended Solids (TSS) and nutrient loading downstream.
- Streambank stabilization by revetments, log cribs, groins, or gabions reduce erosion and TSS and nutrient loading downstream.
- Floodplain restoration and reconnection with the stream course to increase retention time and groundwater recharge.
- Restored native basins to temporarily capture and reduce flow and promote nutrient uptake and groundwater recharge.
- Refurbishment of existing basins for desilting and groundwater recharge.
- Replacing invasive vegetation species with native vegetation that has increased nutrient uptake.
- Removing impediments or impairments to the existing impaired natural wetlands environment to increase nutrient uptake.
- Encouraging further natural development of the existing wetlands so that nutrient uptake is further facilitated.
- Periodic microfloc alum addition to bind dissolved orthophosphate and reduce total phosphorus loading to the Lake.
- Stream gauge installation for long-term flow monitoring.
- Access improvement to facilitate monitoring and periodic alum addition to reduce nutrient loading to the Lake.

As mentioned previously, the selected components of the preferred remedy will be pilot tested before full-scale implementation. The goal of the pilot testing will be to simulate full-scale implementation as much as possible while obtaining the design data needed to scale-up and cost the remedy for complete implementation.

Depending on the results of the Pilot Study, the City of San Marcos, City of Escondido and County of San Diego will continue stream restoration efforts, as needed and if funds are available. The RAs are concerned that a long term funding source for the installation and maintenance of structural best management practices has not been obtained.

The Draft RI/FS is currently being reviewed by the San Diego RWQCB and will follow the regulatory process as outlined in Section 3.5.1.2. Upon completion of the RI/FS and based on RWQCB input, the RAs will subsequently reevaluate the goals, strategies, and schedules for the Upper San Marcos HA. The RAs will also ensure their responsive efforts to the RI/FS are consistent with Addendum B of the Participation Agreement. [http://geotracker.waterboards.ca.gov/profile\\_report.asp?global\\_id=T10000003261](http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000003261)

### Strategy 36 (Table 44) – Implement San Marcos Creek District 401 Water Quality Certification No. 11C058

**Jurisdiction/Area for Implementation:** City of San Marcos: Upper San Marcos HA Focus Area – Drainage Basin A

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities	<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities	<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities
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**Strategy Description:**

In early 2012, Clean Water Act Section 401 Water Quality Certification No. 11C-058 for the San Marcos Specific Plan Project (San Marcos Creek District) was issued by the San Diego RWQCB. The project includes the construction of a raised development pad along the north side of San Marcos Creek and an earthen, vegetated levee along San Marcos Creek between Bent Avenue and Via Vera Cruz to provide the necessary floodway infrastructure. Several roadway improvements are also proposed including widening Discovery Street from McMahr Road to the Bent Avenue/Craven Road intersection, constructing bridges at Via Vera Cruz and Bent Avenue, and widening San Marcos Boulevard by approximately 20 feet to include an additional through lane. Park land in the project area would include trails, grassy areas for picnicking, and other amenities, as well as access to a pedestrian bridge across San Marcos Creek between McMahr Road and Via Vera Cruz, and sidewalks/public trails along the new Via Vera Cruz and Bent Avenue bridges.

Compensatory mitigation and management for riparian habitat including wetlands will occur on the San Marcos Creek and Los Posas Branch floodplains and will consist of:

Type	Acres	Linear Feet
Establishment	23.56	13,975
Re-establishment	1.76	4,515
Enhancement	17.12	13,425
Preservation	9.92	7,280
Buffers	7.91	13,575

Additionally, there is no structural water quality BMPs presently installed in the proposed 217 acres of redevelopment area, and runoff flows into San Marcos and Las Posas Branch untreated. With implementation of the project, non-storm water flows will be eliminated and storm water and flows will be treated with structural BMPs. Proposed water quality BMPs are described in the *Final San Marcos Creek Specific Plan Master Water Quality and Hydromodification Management Plan* (Final Master WQTR), dated December 15, 2011, and in subsequent revisions dated October 16, 2015. The Final Master WQTR will ensure consistency in the application of water quality and hydromodification compliance requirements within each private development project located in the San Marcos Creek Specific Plan area, and will ensure that the Specific Plan area functions in accordance with ongoing watershed planning and pollutant load reduction efforts so that each project takes into consideration its role within the Specific Plan area as well as within the overall Upper San Marcos Creek Watershed.

The combination of riparian habitat mitigation and structural BMP implementation is anticipated to have a positive impact to nutrient reductions and provide overall improved water quality within the project limits and on a larger scale, the Upper San Marcos Creek HA. The 401 permit for the San Marcos Creek project requires bioassessment monitoring before, during, and after impacts have occurred and been mitigated to assess the biological integrity of San Marcos Creek within the project area. In addition, dry and wet weather water quality monitoring is also required to assess structural BMP effectiveness and demonstrate water quality improvements within the project area.

The first phase of the project includes the construction of the raised development pad, levee, roadway and public infrastructure improvements, park land, pedestrian bridge, sidewalk/public trails, and structural post-construction BMPs designed to mitigate water quality and hydromodification impacts associated with the first

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phase of project development. It should be noted that an amendment to Water Quality Certification No.11C-058 was recently submitted to the San Diego RWQCB for review. In general, the amendment includes minor adjustments to the acre size for some of the mitigation types. Once approved, this strategy section will be updated to reflect the changes identified in the amendment.

**Strategy 37 (Table 44) - Promote Incentive Programs for BMP Retrofits**

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Beginning in FY15-16 and continuing on an ongoing basis, the County will promote incentives for water conservation and landscape retrofits through partner agencies (including MWD, local water districts, and the SDCWA) such as turf replacement, sprinkler head nozzle replacements, smart irrigation controllers, rain barrels, etc. Incentive programs may be developed for this program if funding is available. BMP retrofits will target sources of dry weather flows that can mobilize nutrient and bacteria, particularly associated with residential areas as well as roads, streets, and parking.

**Strategy 38 (Table 44) – Annual Focused Training for County Field Staff**

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public;	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Storm water training is an important aspect of watershed protection for municipal staff with defined responsibilities in developing, administering, and implementing the various elements of the County's Jurisdictional Runoff Management Program (JRMP). Training is determined and prioritized by the County to address the watershed highest priority water quality conditions identified in the jurisdiction or the Water Quality Improvement Plan (WQIP). County employees with direct storm water implementation responsibilities include employees who work outdoors and may implement BMPs, those that perform storm water self-inspections and maintenance, and those employees that create or review Stormwater Management Plans (SWMPs), storm water pollution prevention plans (SWPPPs), Facility Pollution Prevention Plans (F3Ps), or inspect/enforce for storm water regulations. As applicable to their job responsibilities, employees may be provided training on topics such as federal, state, and local water quality laws and regulations; general requirements of National Pollutant Discharge Elimination System (NPDES) Order No. R9-2013-0001; the County's Watershed Protection Ordinance (WPO) and other relevant authorities; enforcement response plan; and penalties and liability associated with non-compliance. Additionally, County employees who are likely to observe storm water violations receive awareness training focused specifically on recognizing and reporting potential storm water violations.

**Strategy 39 (Table 44) – Closure and Land Use Designation Change of Golf Course**

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Commercial Facilities; Residential; Land Development and Redevelopment;	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Nutrients; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

During the permit term, the Country Club golf course in the City of Escondido was closed, and the area has been rezoned for residential development. This change is beneficial to water quality as many of the drainages within

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this portion of the HA ran through the former golf course and were therefore vulnerable to potential sources of pollutants from the golf course. Redevelopment of the golf course will occur within the requirements of the BMP Design Manual (2013 design requirements as updated), therefore there will be a requirement to mitigate for runoff from this redevelopment. The City of Escondido will actively pursue opportunities with any future developers to maximize water quality benefits in this area throughout the redevelopment process.

**3.5.4.2.2 San Marcos HA Additional Optional Strategies**

This section describes the additional optional strategies that will be triggered for implementation in response to specific conditions that are described in accordance with the requirements of Permit Provision B.3.b(1)(b).

**Strategy 40 (Table 44) - Ultraviolet Bacteria Treatment Facility Wet Season Operation**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

<b>Target Sources:</b> Municipal Fixed Facilities; Residential; General Public; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The UV treatment facility, located just upstream of Moonlight Beach on Cottonwood Creek, is currently operated only during the dry season. This strategy, if triggered, would also operate the UV treatment facility during the wet season to help reduce wet weather bacteria loading to Moonlight Beach.

**Circumstances to Trigger the Implementation of the Strategy:**

The City of Encinitas will conduct a feasibility study to determine if modifications to the operations of the treatment facility would yield beneficial results from wet weather operation. The following all will need to be satisfied to trigger the strategy:

1) The feasibility study finds that the UV facility can be operated safely and efficiently during the wet season, 2) the feasibility study finds that operating the UV facility can make a significant impact on bacteria concentrations during wet weather conditions, 3) monitoring data demonstrates that additional bacteria load reduction is necessary to meet numeric goals, and 4) funding has been acquired to support UV facility wet weather operation.

**Resources Required to Implement Strategy:**

Staff resources to conduct a feasibility study; staff resources to manage operation of the facility during wet weather; additional energy and maintenance costs, which will be determined by the feasibility study. Depending on the results of the feasibility study, equipment upgrades may also be necessary to allow wet weather operation.

- Staff Resources
- Incentive Items
- Grant Funding
- Partnerships

**Timeline to Secure Resources for Optional Strategy:**

Resources have already been secured to conduct a feasibility study. It is expected that this study will take 1-2 years. If the feasibility study determines no physical upgrades are necessary to operate the UV facility during wet weather, wet weather operation will be initiated within an additional year. If physical equipment upgrades are needed, an additional 2-3 years for design, equipment acquisition, and installation will be needed before wet weather operation can start.

**Strategy 41 (Table 44) - Expanded Polystyrene Ban**

**Jurisdiction/Area for Implementation:** City of Encinitas: HA Wide

<b>Target Sources:</b> Industrial and Commercial Facilities; Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash;	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Polystyrene products are commonly referred to as Styrofoam. Removing trash from the MS4 through this ban is expected to reduce bacteria by preventing the introduction of food wastes and similar materials sometimes found in polystyrene products and also by reducing in-MS4 habitat for bacteria regrowth. The requirements of the ordinance will be implemented on an ongoing basis.

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**Circumstances to Trigger the Implementation of the Strategy:**

The proposed ban requires passing an ordinance. The City has begun the public process necessary to pass the ordinance, but implementation of the ban is contingent on ordinance adoption by City Council.

**Resources Required to Implement Strategy:**

Staff resources to support the ordinance development and adoption process

**Timeline to Secure Resources for Optional Strategy:**

Sufficient staff resources have been acquired, and the process of pursuing an expanded polystyrene ban has begun. Depending on the results of the public process, it may take 1-2 years to complete the ordinance development and approval process.

**Strategy 42 (Table 44) - Highway 101 Green Street Retrofit**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

**Target Sources:**

General Public; Land Development & Redevelopment; Streets and Parking Facilities;

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

Bioretention cells would be installed along portions of Highway 101 in Leucadia to capture and treat storm water. The bioretention cells would be vegetated with native shrubs and grasses. The proposed retrofit would also involve creating curb cuts in the existing curbing at the end of parking rows and along streets. Parking stalls would be paved with permeable pavement.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) sufficient funds to complete project design and construction have been allocated, 3) City staff resources are available to oversee design and construction, and 4) any environmental approvals and regulatory permits are secured.

**Resources Required to Implement Strategy:**

The Cottonwood Creek Watershed LID Retrofit Plan estimated the cost at \$831,310. City staff resources to oversee the design and construction of the project would also be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-2 years)
- Bid and award process (6 months)
- Construction (4-12 months, depending on project size)

**Strategy 43 (Table 44) - Sylvia Street and 4<sup>th</sup> Street Green Street Retrofit**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

**Target Sources:**

Residential, General Public; Land Development & Redevelopment; Streets and Parking Facilities

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

The retrofit would involve creating curb cuts in the existing sidewalk and installing bioretention cells along some sections. The available parking lane would be paved with permeable pavement. The interior portions of the bioretention cells would be vegetated with native shrubs and grasses.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) sufficient funds to complete project design and construction have been allocated, 3) City staff resources are available to oversee design and construction, and 4) any environmental approvals and regulatory permits are secured.



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**Resources Required to Implement Strategy:**

The Cottonwood Creek Watershed LID Retrofit Plan estimated the cost at \$2,511,780. City staff resources to oversee the design and construction of the project would also be necessary. \$2,511,780.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-2 years)
- Bid and award process (6 months)
- Construction (1-2 years)

**Strategy 44 (Table 44) - Ocean View Avenue Green Street Retrofit**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

<b>Target Sources:</b> Residential, General Public; Land Development & Redevelopment; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The proposed retrofit would involve creating curb cuts in the existing curb and installing bioretention cells along some sections. The bioretention areas would be vegetated with native shrubs and grasses. The available parking lane would be paved with permeable pavement to provide additional storage and treatment.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) sufficient funds to complete project design and construction have been allocated, 3) City staff resources are available to oversee design and construction, and 4) any environmental approvals and regulatory permits are secured.

**Resources Required to Implement Strategy:**

The Cottonwood Creek Watershed LID Retrofit Plan estimated the cost at \$469,300. City staff resources to oversee the design and construction of the project would also be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-2 years)
- Bid and award process (6 months)
- Construction (1-2 years)

**Strategy 45 (Table 44) - Arden Drive and San Dieguito Drive Green Street Retrofit**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

<b>Target Sources:</b> Residential, General Public; Land Development & Redevelopment; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The area between the edge of the asphalt and the edge of the right of way that is currently vegetated could be converted to bioretention areas. The bioretention areas would be planted with drought tolerant native vegetation. The parking lanes and areas used for parking could be converted to permeable pavement to provide additional storage and treatment.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) sufficient funds to complete project design and construction have been allocated, 3) City staff resources are available to oversee design and construction, and 4) any environmental approvals and regulatory permits are secured.

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**Resources Required to Implement Strategy:**

The Cottonwood Creek Watershed LID Retrofit Plan estimated the cost at \$1,182,330. City staff resources to oversee the design and construction of the project would also be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-2 years)
- Bid and award process (6 months)
- Construction (1-2 years)

**Strategy 46 (Table 44) - Encinitas Viewpoint Park Green Parcel Retrofit**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

**Target Sources:**

Municipal Facilities; General Public;  
Land Development & Redevelopment

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals;  
Nutrients; Oil and Grease; Sediment;  
Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

The drainage from Viewpoint park is currently directed to the south west corner of the park where it flows through a reverse sidewalk onto East D Street. A bioretention area could be implemented in the south west corner of Viewpoint Park to treat the runoff before flowing into the catch basin on east D street.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) sufficient funds to complete project design and construction have been allocated, 3) City staff resources are available to oversee design and construction, and 4) any environmental approvals and regulatory permits are secured.

**Resources Required to Implement Strategy:**

The Cottonwood Creek Watershed LID Retrofit Plan estimated the cost at \$22,510. City staff resources to oversee the design and construction of the project would also be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-2 years)
- Bid and award process (6 months)
- Construction (4-12 months)

**Strategy 47 (Table 44) - City Public Works Yard Green Parcel Retrofit**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

**Target Sources:**

Municipal Facilities; Land  
Development & Redevelopment;  
Streets and Parking Facilities

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals;  
Nutrients; Oil and Grease; Sediment;  
Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

Impervious areas in the parking stalls could be converted to permeable pavement to treat the precipitation that falls on the stall. To treat additional runoff, the pavement in the channel that diverts runoff to the catch basin could also be converted to permeable pavement and half of Public Works front courtyard could also be converted to bioretention to capture the rain water from landscaping and roof runoff.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) sufficient funds to complete project design and construction have been allocated, 3) City staff resources are available to oversee design and construction, and 4) any environmental approvals and regulatory permits are secured.

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**Resources Required to Implement Strategy:**

The Cottonwood Creek Watershed LID Retrofit Plan estimated the cost at \$398,830. City staff resources to oversee the design and construction of the project would also be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-2 years)
- Bid and award process (6 months)
- Construction (1-2 years)

**Strategy 48 (Table 44) - Vulcan Ave Low Impact Development and Flood Control Project**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

**Target Sources:**

Residential; Land Development & Redevelopment; Streets and Parking Facilities; MS4

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

The project will integrate Green Infrastructure (Low Impact Design) with a new storm drain along Vulcan Ave from north of Union Street to Encinitas Blvd. The green infrastructure will not only improve water quality but will reduce the peak discharge flows which will provide flood control in a cost effective manner. The green infrastructure consists of bioretention and permeable pavement along the NCTD right of way, which is consistent with the Cottonwood Creek Watershed LID Retrofit Plan.

**Circumstances to Trigger the Implementation of the Strategy:**

The following will need to be satisfied to trigger the strategy:

1) Monitoring data demonstrates that additional bacteria reduction is necessary to meet numeric goals, 2) Flooding continues to be a problem along Vulcan Ave, 3) Sufficient funds to complete project design and construction have been appropriated, 4) City staff resources are available to oversee design and construction, 5) All environmental approvals and State and Federal permitting are secured.

**Resources Required to Implement Strategy:**

Staffing resources are needed to develop and administer the program. The level of staff administration needed will depend on the number of projects that propose to comply via offsite alternative compliance and the complexity of tracking offsite BMP maintenance. Staffing resources are estimated at 0.5 to 1.0 FTE to develop the program initially and 0.5 FTE to administer the program on an ongoing basis.

**Timeline to Secure Resources for Optional Strategy:**

Following the finalization of water quality equivalency and crediting systems on a regional basis, it is anticipated that another one to three years would be needed to develop and implement the program within the City of Encinitas.

**Strategy 49 (Table 44) - Leucadia Highway 101 East Side Parking Areas and Storm Water Treatment)**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin and Leucadia Basin

**Target Sources:**

Land Development & Redevelopment; Streets and Parking Facilities;

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

This project will provide additional parking areas at three locations on the east side of North Coast Highway 101; namely, from North Ct to Basil St, from Leucadia Blvd to Diana St, and from Jupiter St to Avocado St. The proposed parking lots would be paved with permeable pavement to provide improved infiltration and water quality. Landscape areas would also be designed to receive and treat storm water runoff.

**Circumstances to Trigger the Implementation of the Strategy:**

The following will need to be satisfied to trigger the strategy: 1) Identification of funds for 100% design and for project construction, 2) Environmental approvals and regulatory permits must be secured, 3) City staff resources must be available to oversee design and construction.

*Continued from previous page*

**Resources Required to Implement Strategy:**

City staff resources to oversee design, environmental approvals, regulatory permits, and construction will be necessary.

**Timeline to Secure Resources for Optional Strategy:**

The approximate timeline, starting from the date triggered, is:

- Design and Permitting: 1-2 years
- Bid and Award Processing: 6 months
- Construction: 12 months

**Strategy 50 (Table 44) - Leucadia 101 Streetscape (Phases I and II)**

<b>Jurisdiction/Area for Implementation:</b> City of Encinitas: Cottonwood Creek Basin and Leucadia Basin		
<b>Target Sources:</b> Land Development & Redevelopment; Streets and Parking Facilities;	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

The City of Encinitas proposes to transform the characteristics of Coast Highway for the 2.5-mile corridor between La Costa Ave and Encinitas Blvd. The Streetscape project goals are to improve safety by reducing vehicular speed, create a more bike-friendly corridor, increase pedestrian circulation, improve parking, and enhance aesthetics. A key project priority will be the introduction of Green Street elements, including permeable pavement and installation of specially designed landscape areas to capture and treat storm water runoff.

**Circumstances to Trigger the Implementation of the Strategy:**

Design and construction of Phase I is fully funded. Partial funding has been allocated for design of Phase II.

The following will need to be satisfied to trigger completion of the strategy:

1) Identification of sufficient funds for Phase II design and construction, 2) City staff resources must be available to oversee design and construction, 3) Environmental approvals and regulatory permits must be secured for both phases.

**Resources Required to Implement Strategy:**

City staff resources to oversee design, environmental approvals, regulatory permits, and construction will be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is:

<b>Phase I:</b>	<b>Phase II:</b>
Design and Permitting: concluding Fall 2017	Design and Permitting: 1-2 years
Bid and Award Processing: 6 months	Bid and Award Processing: 6 months
Construction: 12 months	Construction: 12 months

**Strategy 51 (Table 44) - Lumberyard Sidewalk (East Side Highway 101 Downtown)**

<b>Jurisdiction/Area for Implementation:</b> City of Encinitas: Cottonwood Creek Basin		
<b>Target Sources:</b> Land Development & Redevelopment; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

The project proposes pedestrian improvements, bike lanes, and construction of parking areas and landscape pop-outs along the east side of Highway 101. Permeable pavement and landscaped storm water treatment areas are proposed.

**Circumstances to Trigger the Implementation of the Strategy:**

The following will need to be satisfied to trigger the strategy:

1) Identification of funds for 100% design and for project construction, 2) Environmental approvals and regulatory permits must be secured, 3) City staff resources must be available to oversee design and construction

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**Resources Required to Implement Strategy:**

City staff resources to oversee design, environmental approvals, regulatory permits, and construction will be necessary.

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is:

- Design and Permitting: 1-2 years
- Bid and Award Processing: 6 months
- Construction: 12 months

**Strategy 52 (Table 44) - Coastal Rail Trail**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cottonwood Creek Basin

**Target Sources:**

Land Development & Redevelopment; Streets and Parking Facilities; MS4

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

This project will construct a 1.9-mile multi-use pathway in the community of Cardiff by the Sea along the North County Transit District (NCTD) railroad tracks. The project is a continuation SANDAG sponsored trail system that will eventually span from the Santa Fe Depot in downtown San Diego to Oceanside. To address the increase in impervious area, a series of LID filtration areas will treat pavement runoff. In addition to the use of pervious paving in parking areas, several landscape areas and biofiltration areas will be constructed to improve water quality.

**Circumstances to Trigger the Implementation of the Strategy:**

This project is fully funded for design and construction. The following will need to be satisfied to trigger the strategy:

- 1) Completion of design
- 2) Environmental approvals and regulatory permits secured, and
- 3) Award of construction contract.

**Resources Required to Implement Strategy:**

This project will be funded and constructed by SANDAG. SANDAG staff resources, design approval and permits will be necessary.

**Timeline to Secure Resources for Optional Strategy:**

SANDAG is planning to begin construction of the Cardiff section of the Coastal Rail Trail in the winter of 2017 with construction lasting approximately one year.

**Strategy 53 (Table 44) - Develop and administer an alternative compliance program to onsite structural BMP implementation**

**Jurisdiction/Area for Implementation:** City of Encinitas: HA Wide; City of San Marcos: HA Wide; City of Escondido; County of San Diego: HA Wide

**Target Sources:**

Construction Sites; Land Development & Redevelopment; Existing Development

**Target Stressors/Pollutants/Conditions:**

Nutrients; Bacteria/Pathogens; Trash; Heavy Metals; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides

**Temporal Benefit:**

☒ Wet Weather Conditions  
☒ Dry Weather Conditions

**Strategy Description:**

An alternative compliance program allows development projects to use offsite BMPs or rehabilitation projects to comply with storm water requirements. These BMPs reduce multiple pollutants, including nutrients. Copermittees have funded a Watershed Management Area Analysis and a water quality equivalency standards development process, which are necessary initial steps if an alternative compliance program is to be developed.

The City of San Marcos will develop an alternative compliance program utilizing the guidelines established in the accepted Water Quality Equivalency Guidance for Region 9 and will incorporate potential candidate project areas identified in the Watershed Management Area Analysis. The City of San Marcos is also exploring the development of a possible In-Lieu Fee program.



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The County is currently implementing Phase 1 of the Offsite Alternative Compliance Program as defined in the WPO, Section 67.811(b)(4)(c). This phase allows for an Applicant-Implemented Offsite Alternative Compliance Project (ACP) project. This program became effective on February 26, 2016 and allows for a developer to wholly or partially satisfy their on-site storm water compliance obligations through the implementation of an ACP that is owned or constructed by the PDP project applicant.

The City of Escondido has commenced the identification of potential projects through a “call for projects” in November 2014 and the development of a Hydraulic Study which identified ten potential projects. None of the projects identified are located within the small area of Upper San Marcos Creek watershed which has limited storm drain infrastructure, which is what the study largely focused on, among other factors. However, it is anticipated that as criteria for water quality equivalency for stream rehabilitation projects is developed, that it will be feasible to identify those types of projects within the Upper San Marcos Creek in the City of Escondido.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) The Copermittees finalize water quality equivalency standards for riparian habitat and submit it to the RWQCB for approval, 2) the RWQCB approves the water quality equivalency standards, 3) an acceptable framework for allocating credits for offsite BMPs is developed by the Copermittees and approved by the City, 4) the program does not require the City to take on unfunded long-term maintenance responsibility for BMPs used as a means of compliance by private projects, and 5) adequate staffing resources have been obtained.

**Resources Required to Implement Strategy:**

Staffing resources are needed to develop and administer the program. The level of staff administration needed will depend on the number of projects that propose to comply via offsite alternative compliance and the complexity of tracking offsite BMP maintenance. Staffing resources are estimated at 0.5 to 1.0 FTE to develop the program initially and 0.5 FTE to administer the program on an ongoing basis.

**Timeline to Secure Resources for Optional Strategy:**

Following the finalization of water quality equivalency and crediting systems on a regional basis, it is anticipated that another one to three years would be needed to develop and implement the program within the City of Encinitas.

**Strategy 54 (Table 44) – Implement Structural or Retrofit BMPs**

**Jurisdiction/Area for Implementation:** City of San Marcos: HA Wide; City of Escondido: HA Wide

<b>Target Sources:</b>	<b>Target Stressors/Pollutants/Conditions:</b>	<b>Temporal Benefit:</b>
Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Land Development & Redevelopment; Streets and Parking Facilities; MS4	Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions

**Strategy Description:**

Implement structural (engineered) BMPs or retrofitting existing structural BMPs to address flow and/or pollutant issues

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the Cities to implement. Opportunities for retrofit are identified.

**Resources Required to Implement Strategy:**

Voter/council approval of projects; staffing necessary to implement the planning, design and construction of such projects; project funding; required permits from state and federal regulatory agencies.

**Timeline to Secure Resources for Optional Strategy:**

If implemented, structural BMPs will be integrated into the City’s Capital Improvement Program for planning, design and construction. Many of the City’s typical capital projects are funded through dedicated sources, e.g., transportation tax dollars. Structural BMPs will have to identify alternative sources of funding, e.g., grants or partnerships, and therefore may take longer to process than typical capital projects. It is estimated that structural BMP projects may take five years to secure the resources necessary to initiate each project within the strategy.

### Strategy 55 (Table 44) – Assessment of Agricultural Operations within City Jurisdiction/Active Engagement As-needed

**Jurisdiction/Area for Implementation:** City of Escondido: HA Wide

<b>Target Sources:</b> Land Development & Redevelopment;	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Toxicity; Riparian Habitat;	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

This will include: Prepare and maintain a figure of the locations of agricultural operations in Escondido; identifying agricultural land close to receiving waters and/or MS4 system; conducting a site reconnaissance to assess if discharges are likely to occur; developing a series of follow-up actions specific to those risks. Sites of concern will be referred to the Irrigated Lands Group at the RWQCB.

**Circumstances to Trigger the Implementation of the Strategy:**

If agricultural properties within the City of Escondido are determined to be a potential source of nutrients, and interim load reduction goals are not met, this strategy will be triggered.

**Resources Required to Implement Strategy:**

The resources required for this strategy include: staff time and budget to administer the program, administrative procedures developed and enacted, and (potentially) outreach materials developed directed at this specific audience. The estimated cost of implementation of this strategy is unknown at this time

**Timeline to Secure Resources for Optional Strategy:**

This strategy would be ongoing and require approximately 6-12 months to develop the program.

### Strategy 56 (Table 44) – Implement Sustainable Landscapes Program

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Land Development & Redevelopment; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Implement sustainable landscapes program to encourage landscape retrofits. This program will have a multi-pollutant benefits in addition to nutrients and bacteria from residential areas, nurseries, and greenhouses.

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the County to implement;

**Resources Required to Implement Strategy:**

Secured partnerships needed for implementation; staffing necessary to implement the planning; project funding; Incentives are available.

**Timeline to Secure Resources for Optional Strategy:**

Implementation in FY 2016-2017, and continuous until grant funding and incentives are depleted; future implementation schedule 1 year once triggered.

### Strategy 57 (Table 44) – Divert persistent dry weather flows from storm drains to sewer

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Divert persistent dry weather flows to sewer to address flow and/or pollutant issues if programmatic approaches are ineffective. This strategy address nuisance dry weather flows from the MS4 and pollutants from roads, streets, and parking lots.

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the County of San Diego to implement; permission is granted from sewer agency; and ground water or permitted discharges have been ruled out.

*Continued from previous page*

**Resources Required to Implement Strategy:**

Voter/council approval of projects; grant funding or alternative source; contractor funding necessary to implement the planning, design and construction of such projects; environmental review; project funding; required permits from state and federal regulatory agencies and ongoing funding for operation/maintenance.

**Timeline to Secure Resources for Optional Strategy:**

The implementation schedule is 3-6 years once triggered, continuous as needed.

**Strategy 58 (Table 44) – Implement Stream Restoration Activities**

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide; City of Escondido: HA Wide; City of San Marcos: HA Wide

<b>Target Sources:</b> Roads, Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Implement stream restoration projects on publically owned parcels of land.

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the County to implement.

**Resources Required to Implement Strategy:**

Grant funding or alternative source; contractor funding necessary to implement the planning, design and construction of such projects; procurement of equipment; required permits from state and federal regulatory agencies; and ongoing funding for operation/maintenance.

**Timeline to Secure Resources for Optional Strategy:**

The implementation schedule is 2-3 years once triggered, implementation as needed.

**Strategy 59 (Table 44) – Program to remove invasive non-native plants**

**Jurisdiction/Area for Implementation:** City of San Marcos and County of San Diego: HA Wide

<b>Target Sources:</b> Land Development & Redevelopment; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Implement a program to remove invasive non-native plants in upstream areas, rivers, or tributaries to restore natural habitat with the potential to improve hydrology and water quality.

**Circumstances to Trigger the Implementation of the Strategy:**

Interim goals are not met; progress towards numeric goals is not adequate; community support and partnerships established; and it has been determined that invasive plants have an impact on water quality.

**Resources Required to Implement Strategy:**

Voter/council approval of projects; contractor funding; project funding; required permits from state and federal regulatory agencies; partnerships.

**Timeline to Secure Resources for Optional Strategy:**

The implementation schedule is 3-5 years once triggered, implementation as needed.

**3.5.4.2.3 Watershed Management Area Strategies**

Watershed Management Area Strategies to be implemented within the Carlsbad WMA are described in Section 2.4.4.

**3.5.5 San Marcos HA Monitoring and Assessment**

The RAs will conduct the following monitoring in the San Marcos HA including the collective watershed-wide monitoring activities described in Section 2.5:

- Progress Toward Interim and Final Goals
- Bacteria TMDL Monitoring at Moonlight Beach
- Dry Weather Special Study

- Bacteria Special Study (Bight 13)
- MS4 Outfall Monitoring (as described in Section 2.6)
- JRMP Implementation (as described in Section 2.6)
- Regulations and Policy (as described in Section 2.6)

#### *Progress toward Interim and Final Goals*

To assess progress toward achieving the interim and final goals, the San Marcos HA RAs will monitor identified outfalls periodically specifically for flow conditions, e.g., rates and volumes. At select outfalls, in addition to flow conditions, the RAs will collect the following data as part of the MS4 Outfall Monitoring Program, at minimum, during dry weather conditions with a multi pollutant target objective:

- |                           |                               |
|---------------------------|-------------------------------|
| • Total Dissolved Solids  | • Ammonia                     |
| • Total Suspended Solids  | • Cadmium                     |
| • Total Hardness          | • Copper                      |
| • Total Phosphorus        | • Lead                        |
| • Orthophosphate          | • Zinc                        |
| • Nitrite                 | • Total Coliform              |
| • Nitrate                 | • Fecal Coliform (or E. Coli) |
| • Total Kjeldahl Nitrogen | • Enterococcus                |

In addition, the identified outfalls will collect data to evaluate applicable NALs and 303d listed constituents as proposed in the MS4 Outfall Monitoring Plan that provides a tailored analyte list per HA.

In order to assess program impacts, the RAs established baseline flow during the dry weather season of 2015. Future monitoring will provide flow conditions periodically to calculate percent change from baseline conditions. These calculated percent changes in flow conditions will be the assessment tool used to determine the progress towards achieving interim goals in the San Marcos HA.

RAs will also conduct a special study that will inform the data collection and assessment for determining progress towards achieving the final goals for the San Marcos HA. Details of the special study are below.

#### *Bacteria TMDL Compliance Monitoring*

Compliance monitoring during wet and dry weather will be conducted each year at the AB411 monitoring site (EH-420) located within the Pacific Ocean shoreline segment at Moonlight State Beach.

The data generated will be used to address the following questions:

- Are TMDL numeric targets for fecal indicator bacteria (FIB) being met at the compliance monitoring locations?
- Are levels of FIB decreasing at the compliance monitoring locations?

Dry weather monitoring will be conducted by the City of Encinitas on dry weather days, after an antecedent dry period of 72 hours with less than 0.1 inch of rainfall, in accordance with the MS4 Permit. Consistent with historical AB 411 Program requirements, dry weather sampling will be conducted weekly between April 1 and October 31, when recreational activities are more likely to occur. Weekly dry weather samples will be collected so that at least five samples are collected in each calendar month (30 days).

During the wet season (October 1 through April 30), the City of Encinitas will conduct monthly dry weather monitoring (at a minimum) and wet weather monitoring during one to three storm events. Wet weather samples will be collected within 72 hours after end of rainfall. Storms resulting in greater than 0.1 inch of

precipitation will be targeted for sample collection. Fecal indicator bacteria (FIB) are the target constituents for the Pacific Ocean Shoreline at Moonlight State Beach, as indicated in Attachment E of the MS4 Permit.

The proposed Bacteria TMDL Monitoring Plan describes detailed monitoring procedures and analytical methods that are illustrative and may be revised on the basis of site-specific environmental conditions and updated methodology.

#### *San Marcos HA Dry Weather Special Study*

A Dry Weather Special Study will be implemented to characterize temporal flow and nutrient and fecal indicator bacteria patterns at identified persistently flowing major MS4 outfalls during summer dry weather conditions. The City of San Marcos and County of San Diego will collect nutrient data, additionally, the City of San Marcos will collect bacteria data where appropriate. The City of San Marcos and County of San Diego will implement this study in priority areas within their jurisdictions in the Upper San Marcos HA.

The Dry Weather Special Study will address the following questions:

- What is the baseline flow at the specified major MS4 outfalls during summer dry weather conditions?
- What are the temporal flow patterns at specified major MS4 outfalls during summer dry weather conditions?
- Are summer dry weather flows at the specified major MS4 outfalls contributing fecal indicator bacteria or nutrients to the receiving water(s)?
- What are the temporal patterns of indicator bacteria concentrations and nutrient concentrations at specified major MS4 outfalls?

The study will:

- Address data gaps related to temporal flow and nutrient and/or fecal indicator bacteria patterns at identified persistently flowing major MS4 outfalls during summer dry weather conditions.
- Allow the City of San Marcos to understand potential sources of flow and therefore more effectively target and control sources contributing to the Priority Water Quality Conditions.
- Establish a baseline for flow during summer dry weather conditions with which to measure subsequent flow reductions.

The City of San Marcos and the County of San Diego will conduct the special study at an outfall level as well as collectively with other outfall data collected under the same special study throughout the WMA. The following components of the special study will be conducted:

- Collect continuous flow monitoring data at specified major outfalls using automated flow meter and data logger.
- Conduct monitoring events at identified major outfalls specified in Table 45
- Collect grab samples and analyze for nutrients (total Phosphorous and total Nitrogen) to identify critical conditions for nutrients.
- Collect grab samples and analyze for fecal indicator bacteria (total coliform, fecal coliform, and Enterococcus) as appropriate to identify critical conditions for bacteria.
- Record visual observations consistent with the transitional outfall monitoring program.
- Collect in-situ physical parameters for pH, temperature, and specific conductivity.



- Perform site observations at key times within the catchment areas and record all observed areas and/or sources with non-storm water flow.
- Track flow patterns to sources for abatement or further investigation.

**Table 45: Dry Weather Data Collection by Jurisdiction for the San Marcos HA**

Item	City of San Marcos	County of San Diego
Number of Focus Areas in San Marcos HA	3	2
Number of Outfalls for Continuous Flow Monitoring	3	2
Minimum Time for Continuous Flow Monitoring	2 weeks	Dry season (May to September)
Minimum Number of water quality samples at Each Outfall Where Flow is Measured	4	4
Total Number of Water Quality Samples	12 <sup>1</sup>	8 <sup>2</sup>

Notes:

1 – City of San Marcos will analyze water quality samples for nutrients and bacteria.

2 – County of San Diego will analyze water quality samples for nutrients and as appropriate for bacteria.

3 – There are no major outfalls identified in the City of Escondido, so similar sampling cannot be conducted there.

#### *San Marcos HA Microbiology Drainage Water Special Study*

MS4 drainages may greatly influence the exceedance frequency of water quality standards for *Enterococcus*, a type of fecal indicator bacteria at beaches. However, as stated in the Bight '13 Microbiology Drainage Water Study Work Plan, “because *Enterococcus* is a non-specific indicator of fecal material, the extent to which these flows contain human fecal contamination is unclear”. The goal of the study is to assess the extent of human fecal contamination from coastal drainages to the ocean to inform RAs as to the extent of the problem and to assist in prioritizing individual sites for remediation efforts or adoption of alternative management strategies (Griffith, 2010).

The City of Encinitas has elected to participate in the Bight '13 Microbiology Drainage Water Study as it will generate data to characterize the potential contribution of human fecal contamination from the San Marcos HA to Moonlight Beach and to inform strategies or management actions related to indicator bacteria. Each agency participating in the program will sample within its jurisdiction at identified sites and samples will be analyzed for a human-associated fecal marker (HF183) to gauge the presence of human fecal material in each sample (Griffith, 2010). Overall, twenty-six sites will be sampled during dry weather and twenty-four during wet weather or storm conditions. Both frequency and magnitude of human signal will be considered for assessing the extent of human fecal contamination using the percentage of samples positive for human fecal material at each site and across the region.

#### *Flow and Water Quality Monitoring at Upper San Marcos Creek*

To assess progress toward achieving the interim and final numeric goals related to nutrients, the County of San Diego in collaboration with the cities of San Marcos and Escondido, will determine long-term water quality monitoring needs in Upper San Marcos HA. This monitoring will be described in the Monitoring and Assessment Plan currently under development. The temporary watershed assessment station (SM-TWAS-1a/b) located in the Upper San Marcos HA has been monitored regularly in wet and dry weather since 2008 and was used to establish the baseline for the WQIP nutrient goal. Continuous flow monitoring and annual wet event monitoring will continue at the SM-TWAS-1a, or another site as appropriate, in order to calculate event and annual nutrient loads.

### *Assessment*

The San Marcos HA RAs will perform assessments of the following elements:

- Progress Toward Interim and Final Goals
- Bacteria TMDL Monitoring at Moonlight Beach
- Dry Weather Special Study
- Bacteria Special Study (Bight 13)
- Pilot Testing of Stream Restoration

As new data and information becomes available, the RAs will perform an integrated assessment of the findings from the identified focused areas. The integrated assessment will evaluate the JRMP program implementation in relationship to the findings of the assessment for progress toward interim and final goals. This integrated assessment would be performed at this scale to identify relationships between the strategies implemented in the focus areas and outcomes related to the interim and final goals. The outcomes of this assessment could be used to help determine the effectiveness and efficiency of identified the strategies implemented.

The temporary watershed assessment station (SM-TWAS-1a/b) located in the Upper San Marcos HA has been monitored regularly in wet and dry weather since 2008 and was used to establish the baseline for the WQIP nutrient goal. Long-term flow monitoring and annual wet event monitoring will continue at the SM-TWAS-1a in order to calculate event and annual nutrient loads. The monitoring data and results of the assessments will be used to evaluate progress toward interim and final goals.

Longer-term assessments will be performed at the WMA scale as appropriate data and information is collected and assessed.

### 3.6 Escondido Creek HA (904.6)

The Escondido Creek Hydrologic Area is the largest and most complex system within the WMA. The HA extends approximately 24.6 miles inland from the coast and totals 54,100 acres in the area, comprising 40 percent of the WMA. Over half of the HA is in unincorporated areas of the County (55 percent). The remaining is in the cities of Escondido and Encinitas, with a small portion in San Marcos and Solana Beach (Figure 41).

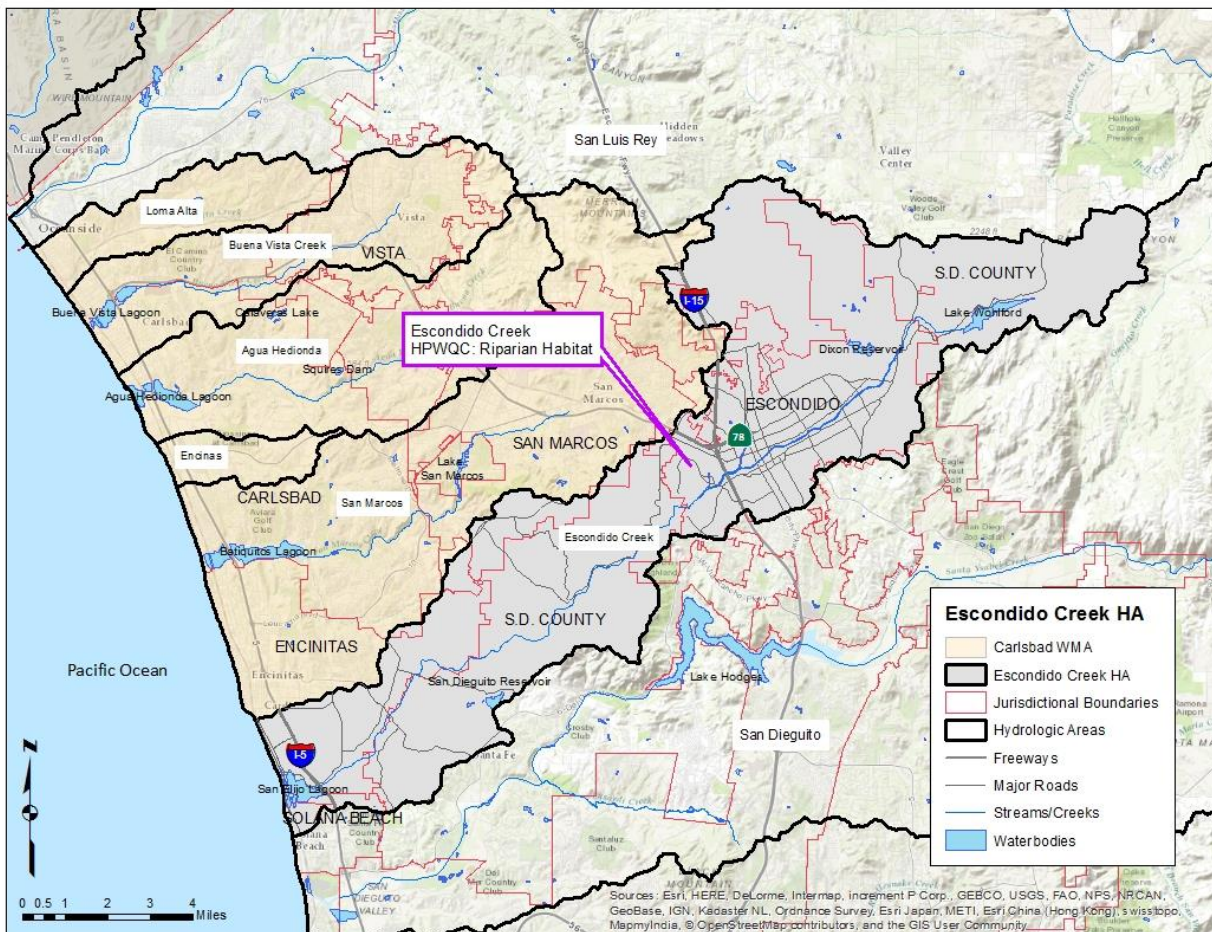


Figure 41: Escondido Creek Hydrologic Area

There are two reservoirs within the watershed: Lake Wohlford and Dixon Lake. The primary receiving waters are Escondido Creek, Lake Wohlford, Lake Dixon, Reidy Creek, San Elijo Lagoon, and the Pacific Ocean.

Escondido Creek watershed originates in Bear Valley in north central San Diego County and discharges into the Pacific Ocean via San Elijo Lagoon. The San Elijo Lagoon lies between the cities of Encinitas and Solana Beach. It has 576 acres of Wetland habitat, receiving freshwater from Escondido Creek. Elevations within the HA range



Escondido Creek: Concrete Lined



from sea level to 2,420 feet on the ridges above Bear Valley in the vicinity of Daley Ranch, a 3,000-acre conservation area managed by the City of Escondido.

The San Elijo Lagoon is on the 2010 303(d) List for indicator bacteria, eutrophic conditions, and sedimentation/siltation. Escondido Creek is listed for: DDT (Dichlorodiphenyltrichloroethane); Enterococcus; Fecal Coliform; Manganese; Phosphate; Selenium; Sulfates; Total Dissolved Solids; Total Nitrogen as N; Toxicity.



San Elijo Lagoon: Wildlife and Wetlands Habitat



Escondido Creek: Riparian Habitat

Approximately 60 percent of the watershed is developed (40 percent is open space or undeveloped) and is comprised of the following land uses: residential (34 percent), commercial and industrial (4 percent), roads and railway (8 percent), and other land uses (14 percent). All of these land uses are potential sources of pollutants and have potential impacts on the water quality discharged from the RAs' storm drain system.

### 3.6.1 Water Quality Conditions

During the WQIP development process, the RAs gathered data and information to assess the conditions of water quality in the Escondido Creek hydrologic area, and to prioritize the identified water quality conditions. These efforts included:

- Developing a list of references for relevant data and information that may be used during the development of the Carlsbad WMA WQIP
- Conducting a solicitation process to request and receive public input for water quality conditions
- Holding facilitated workshops to receive input from the public and the watershed consultation panel
- Reviewing and analyzing the available data and information as summarized in Section 2.1 of this WQIP

Based upon review and analysis of the gathered data and information, the following constituent groups were found to be of *low* priority for receiving waters within the Escondido Creek HA:

- oil & grease;
- metals;
- organics;
- pesticides under dry conditions;
- nutrients under wet conditions; and
- sediment related impacts under dry conditions

#### *3.6.1.1 Priority Water Quality Conditions*

The RAs used the information gathered to assess the receiving water conditions (refer to Section 2.1, Table 3) and the impacts from MS4 sources (refer to Section 2.1, Table 4) to develop a “list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters” Permit Provision B.2.c.).

The assessment of existing data for the Escondido Creek HA identified PWQCs as: indicator bacteria in Escondido Creek and San Elijo Lagoon; toxicity in Escondido Creek; nutrients in Escondido Creek; sediment/siltation in San Elijo Lagoon; and eutrophic condition in San Elijo Lagoon (Table 46).



**Table 46: Escondido Creek HA Priority Water Quality Conditions**

Waterbody	Hydrologic Area	Basin Number	Pollutant, Stressor or Condition	Beneficial Uses	Temporal Extent	Responsible Agencies Tributary to Waterbody
All water bodies within the Carlsbad WMA	All	All	Trash	All	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>1</sup>
All water bodies within the Carlsbad WMA	All	All	Riparian Habitat	WARM;REC-1	Dry and Wet Weather	Oceanside, Vista, San Diego County, Carlsbad, Escondido, Encinitas, San Marcos, Solana Beach <sup>1</sup>
Escondido Creek	Escondido Creek Hydrologic Area	904.60	Indicator Bacteria	REC-1	Wet Weather	Encinitas, Escondido, San Marcos, San Diego County
Escondido Creek	Escondido Creek Hydrologic Area	904.60	Toxicity	WARM	Dry Weather	Encinitas, Escondido, San Marcos, San Diego County
Escondido Creek	Escondido Creek Hydrologic Area	904.60	Nutrients Category <sup>1</sup>	WARM	Dry and Wet Weather	Encinitas, Escondido, San Marcos, San Diego County
San Elijo Lagoon	Escondido Creek Hydrologic Area	904.61	Indicator Bacteria	REC-1	Dry Weather	Encinitas, Escondido, San Marcos, Solana Beach, San Diego County
San Elijo Lagoon	Escondido Creek Hydrologic Area	904.61	Sediment/Siltation <sup>2</sup>	WARM	Dry and Wet Weather	Encinitas, Escondido, San Marcos, Solana Beach, San Diego County
San Elijo Lagoon	Escondido Creek Hydrologic Area	904.61	Eutrophic	WARM	Dry Weather	Encinitas, Escondido, San Marcos, Solana Beach, San Diego County

<sup>1</sup>This is a watershed-wide PWQC and all jurisdictions are listed. However, only the Cities of Encinitas, Escondido, San Marcos, and Solana Beach and County of San Diego are located within the Escondido Creek HA.

<sup>2</sup>Based on 2011 LTEA, nutrients category includes at least two or more of the following pollutants: Dissolved Phosphorous; Orthophosphate; Total Phosphorous; Total Kjeldahl Nitrogen; Total Nitrogen; Eutrophication; or Benthic Algae

### 3.6.1.2 Highest Priority Water Quality Conditions

Once the PWQCs were identified, the next step was to “identify the highest priority water quality conditions to be addressed by the WQIP and provide the rationale for selecting a subset of the [priority] water quality conditions identified”. The RAs established the process identified in Section 2.2 to identify the HPWQCs within the Carlsbad WMA. Figure 7 provides an illustration of the process. Although a subset of priority water quality conditions are identified as the highest priority condition(s), other priority water quality conditions are expected to be positively impacted through strategies identified for implementation by the RAs (LTEA, 2011 and CASQA). Table 49 identifies the multi-pollutant benefits of the strategies to be implemented within the HA.

Table 47 lists the HPWQC for the Escondido Creek HA that were identified using the process outlined in Section 2.2. The rationale for selecting the HPWQC was based on Step 3 of Figure 7. The HPWQC includes riparian habitat in Escondido Creek. More information on the rationale for HPWQC identification is described below.

**Table 47: Escondido Creek HA Highest Priority Water Quality Conditions**

Hydrologic Area	Applicable Receiving Water*	Highest Priority Water Quality Condition (Condition, Pollutant, or Stressor)	Temporal Extent
Escondido	Escondido Creek	Riparian Habitat	Dry and Wet Weather

\*While HPWQCs may not be identified for every receiving water, strategies addressing applicable HPWQCs and PWQCs are being implemented throughout the watershed and are included in each HA Section in Section 3 of this WQIP.

The San Elijo Lagoon is a receiving water within the Escondido Creek HA, and significant efforts to restore the San Elijo lagoon have been initiated. The RAs are coordinating with the San Elijo Lagoon Conservancy and California Department of Fish and Wildlife on restoration efforts. An Environmental Impact Report/Environmental Impact Statement for the San Elijo Lagoon Restoration Project prepared for the U.S. Army Corps of Engineers and County of San Diego Department of Parks and Recreation was finalized in February 2016. The San Elijo Lagoon Restoration Project (SELRP) plans to restore ecological functions in the San Elijo Lagoon and the lagoon study area is composed of approximately 960 acres. The SELRP conceptual mitigation plan states:

*The proposed project aims to improve water quality and enhance tidal exchange of the lagoon with the ocean by removing nutrient-rich sediments and modifying existing constraints such as a limited channel network and constraints to tidal influence, such as fill for Coast Highway 101, the North County Transit District railroad, Interstate 5, and a dike owned by California Department of Fish and Wildlife. Habitat distributions proposed by the SELRP would represent a more connected gradient of balanced habitat types that would provide both nesting and foraging habitats for a variety of bird species, provide additional habitat for fish and benthic invertebrates, and benefit other species. The project also aims to create a more resilient ecosystem that can accommodate future climate change scenarios, including sea level rise, through the incorporation of higher elevation transitional areas.*

As identified in Table 49, all RAs will implement strategies throughout the Escondido Creek HA that will support the SELRP efforts by reducing and minimizing the impacts from the watershed into the lagoon. This will be achieved through the reduction of storm water discharges from the RAs storm drain system, implementation of structural BMPs (i.e. North Cedros Storm Water Treatment Unit) and incentive programs (i.e. Rain Barrel, Live Turf Replacement and Outdoor Water Efficiency Program).

Since the restoration of the San Elijo Lagoon will address the identified San Elijo Lagoon PWQCs, the RAs will focus efforts on the Escondido Creek PWQCs for the WQIP. Of the PWQCs identified for the Escondido Creek HA, riparian habitat within Escondido Creek was identified to be the HPWQC (Table 47)<sup>21</sup>.

Improving riparian habitat was identified due to the many benefits a healthy riparian habitat can have on water quality. A healthy riparian habitat can be achieved through a range of strategies (for example through habitat restoration, elimination of trash or non-storm flows). Selecting a condition to improve riparian health can indicate overall progress in eliminating priority water conditions associated with discharges from the MS4.

Restoration of riparian habitats can improve water quality by allowing filtration of pollutants and reducing sedimentation through river bank stabilization. The role of riparian areas in water quality improvement includes processing, removing, transforming, and storing such pollutants as sediment, nitrogen, phosphorous, and certain heavy metals (Washington State Department of Ecology, 1996). Riparian habitat has been identified as the HPWQC in the Escondido Creek HA based on a number of local factors, including public knowledge of the condition, and the availability of a rare opportunity to restore riparian habitat within Escondido. Improving riparian habitat in the Escondido Creek HA area will provide multiple water quality benefits and improve the assimilative capacity of the receiving waters. Restoration projects can also raise public awareness and appreciation of local waterways.

### 3.6.2 Escondido Creek HA Sources

The two primary sources causing and contributing to riparian habitat health are land use and impervious surfaces. Urbanized areas with impervious surfaces are a known source that can increase the variety and amount of pollutants that have the potential to enter the MS4 and receiving waters. Impervious surfaces do not allow storm water to infiltrate into the ground which can greatly increase the volume and velocity of storm water runoff causing hydromodification and habitat degradation impacts. Figure 42 presents the land uses within the Escondido Creek HA.

The RAs within Escondido Creek HA have identified and targeted land uses and areas that are suspected of causing and contributing to riparian habitat degradation issues within the HA. These areas and land uses are described in more detail in strategies included in Section 3.6.4.1.

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<sup>21</sup> The City of Solana Beach has a small contribution (1%) to the HA and is not tributary to Escondido Creek. Although Solana Beach will be implementing strategies in the HA to address PWQCs, Solana Beach has not identified a HPWQC to establish goals for in the Escondido Creek HA. Rather, in addition to the PWQCs in Escondido Creek HA, they are focusing on the San Dieguito WMA HPWQC (bacteria) and efforts to meet the bacteria TMDL requirements in that WMA.

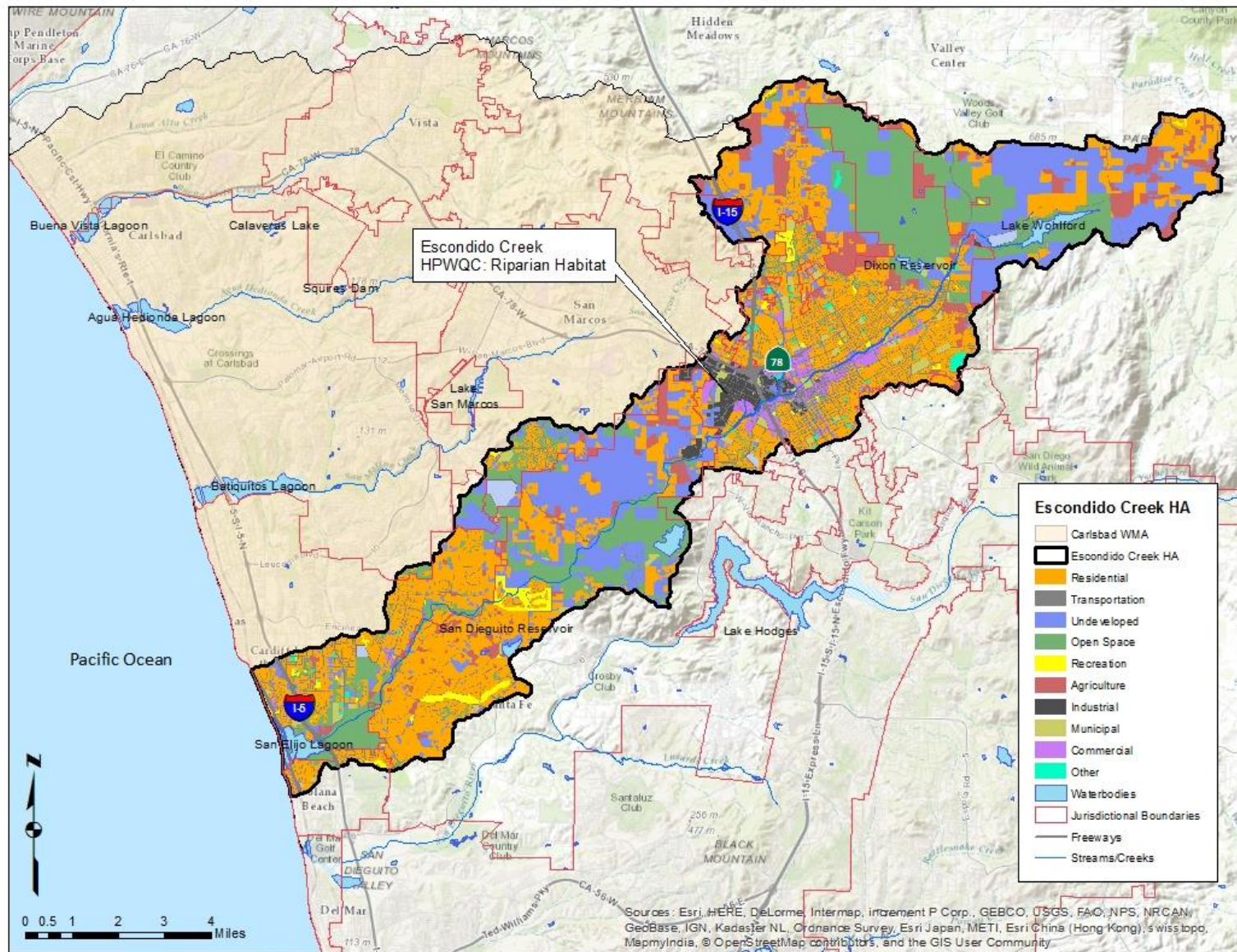


Figure 42: Escondido Creek Hydrologic Area Land Uses



### 3.6.3 Escondido Creek HA Goals and Schedules

Identifying goals and the means to achieve them is a fundamental component of the Carlsbad WMA. Goals define realistic water quality improvement outcomes and provide direction and purpose to program planning. Interim and final numeric goals were identified as benchmarks for program performance and assessing progress through a measureable and quantifiable mechanism. The interim and final goals and associated schedules for the Escondido Creek HA's restoration project are provided in Table 48. Figure 43 identifies the location for the City of Escondido's restoration project (Spruce Street Channel).

The City of Escondido is the only municipality that drains to the Spruce Street Channel, although other entities such as school districts and transportation agencies are also located in the HA. Spruce Street Channel flows into Escondido Creek which ultimately drains to the San Elijo Lagoon. The Spruce Street Channel restoration project is consistent with the San Elijo Lagoon restoration as it will allow infiltration and assimilation of flows and the removal of sediment (issues noted in the San Elijo Lagoon EIR) prior to the confluence with Escondido Creek. The priority condition analysis identified potential impacts on beneficial uses such as WARM habitat.

Of the water bodies within the City of Escondido, Spruce Street Channel was deemed to have the greatest potential for improvements benefitting both water quality and the community. While most other water bodies within the City are largely channelized and fenced to prevent public access, several segments of Spruce Street Channel are directly accessible to the public and adjacent to the North County Transit District's Transit Center. In Escondido Creek, impacts on riparian area quality include non-native bank vegetation in the Transit Center area and occasional trash at various points along the Creek as identified in public comment. Improving riparian area quality in Spruce Street Channel is part of the City's larger vision to provide residents and visitors with improve access to natural environments and green spaces, and to raise awareness of the Escondido Creek within the City of Escondido. The City has also established a partnership with a local environmental group (the Escondido Creek Conservancy) and adjacent businesses and property owners. Improvements to the riparian area quality in the Spruce Street channel may positively impact the downstream Escondido Creek and San Elijo lagoon.



**Table 48: Interim and Final Goals for Escondido Creek HA**

<b>Hydrologic Area : Escondido Creek</b>			
<b>High Priority Water Quality Condition: Riparian Habitat<sup>1</sup></b>		<b>Applicable Receiving Water(s): Escondido Creek</b>	
<b>Pollutant/Stressor: Various<sup>1</sup></b>		<b>Responsible Agencies: City of Escondido</b>	
<b>Interim Goal (2013-2018) 2018</b>	<b>Interim Goal (2018-2023) 2023</b>	<b>Interim Goal (2023-2028) 2028</b>	<b>Final Goal (2028-2030) 2030</b>
<ul style="list-style-type: none"> <li>Commence construction of 130 feet of the Spruce Street Project (Phase 1 - Valley Parkway overpass, 9% of total project length)<sup>1</sup> OR</li> <li>Removal of invasive species and accumulated sediment from a 250-foot long portion of the Spruce Street Channel project area<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>Complete 130 feet of the construction for Spruce Street Project (Phase 1 - Valley Parkway overpass, 9% of total project length)<sup>1</sup> OR</li> <li>Removal of invasive species and accumulated sediment from a 250-foot long portion of the Spruce Street Channel project area<sup>2</sup> OR</li> <li>Prioritize implementation of trash policy measures, as needed per State requirements, in drainage area ESC_134 (737 acres) to benefit Spruce Street Channel Project.</li> </ul>	50% of rehabilitation project at Spruce Street Channel complete	Rehabilitation of 1400 linear feet of open channel and drainage infrastructure as part of the Spruce Street Project

<sup>1</sup> Phase I includes the widening of Valley Parkway to accommodate pedestrian traffic, installing an extra culvert to increase capacity of tributary flow under Valley Parkway, and removing invasive species and sediment in the area of the bridge to allow the work to occur. Grant funding has been secured for this portion of the Spruce Street Project. This is the projected timeline, but implementation dates may change depending on agency and access permitting. The schedule will be updated as applicable in WQIP Reports.

<sup>2</sup> This is the projected timeline, but implementation dates may change depending on environmental permitting and/or funding. The schedule will be updated as applicable in WQIP Reports.

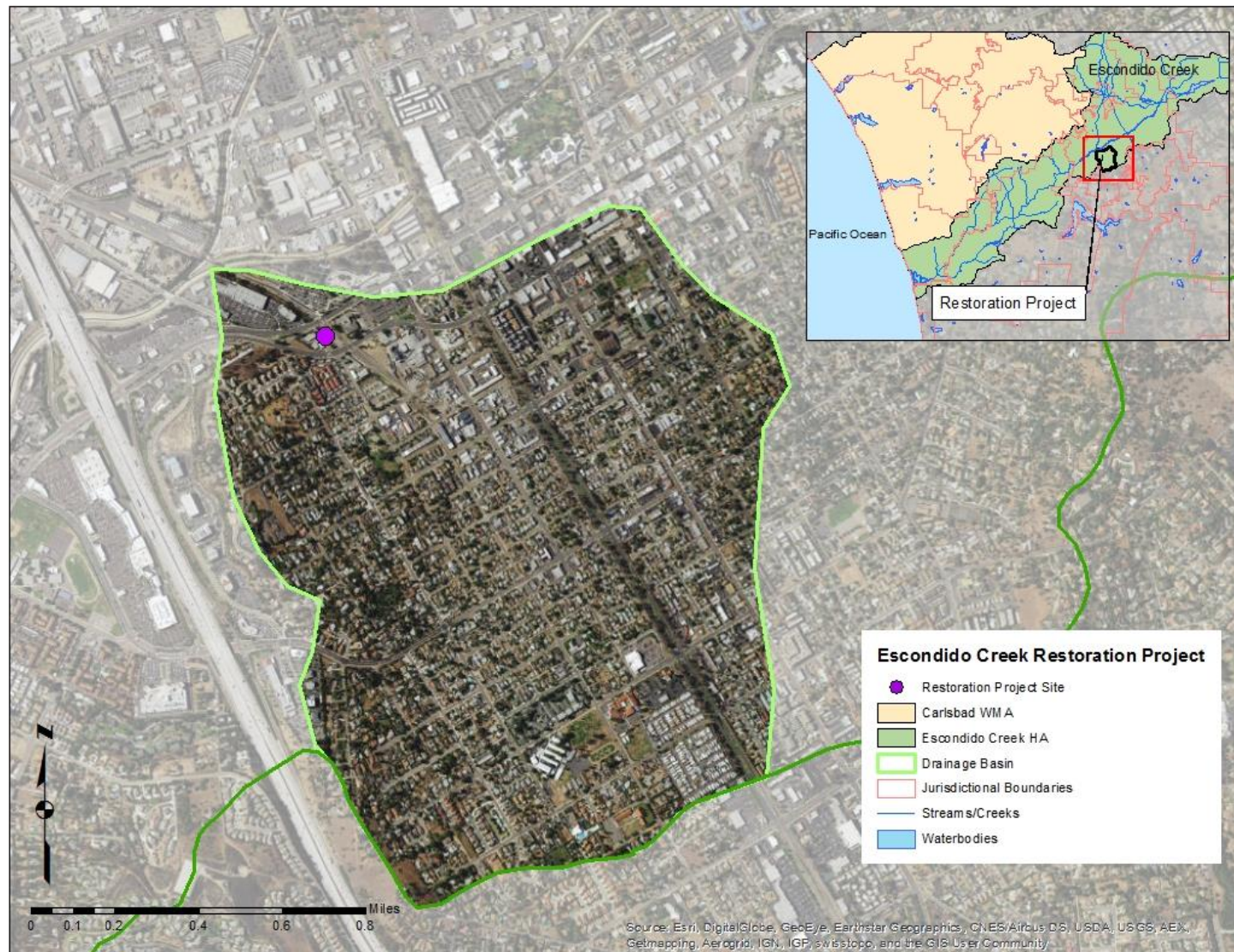


Figure 43: Escondido Creek Restoration Project Location

### 3.6.4 Escondido Creek HA Strategies

Based on the process and information identified in Section 2.4, the RAs within the Escondido Creek HA identified the strategies to be implemented, or triggered for implementation if necessary to address the HPWQC, and PWQCs to the maximum extent practicable (MEP). In addition to the focus placed on the HPWQC, the RAs' strategies will be implemented within the respective RA's jurisdiction to effectively prohibit non-storm water discharges to the MS4, reduce pollutants in storm water discharges from the MS4 to the MEP, and protect the beneficial uses of the receiving waters from MS4 discharges in order to achieve or maintain the interim and final numeric goals. Furthermore, in some cases, strategies include those that improve or enhance the natural beneficial watershed features: wetlands; riparian habitat; upland vegetation; and connectivity.

Table 49 identifies the Water Quality Improvement Strategies to be implemented throughout the entire Escondido Creek HA. The WQIP strategies that are targeted to improve the HPWQC, riparian habitat in the Escondido Creek HA, are highlighted in the yellow column. The WQIP strategies that are associated with the PWQCs are noted by the green highlighted columns. The table includes planned strategies to be implemented as part of the Copermittees' core programs and additional, "optional" strategies that Copermittees will implement to target the HPWQC or PWQCs.<sup>22</sup> RAs have in many cases enhanced their jurisdictional strategies to target specific areas or sources that are causing or contributing to the HPWQC or PWQCs in the Escondido Creek HA. HA-specific geographic characterizations and prioritization is described in Section 3.6.4.1 and are noted in Table 49 where applicable. Additional optional strategies are also identified in Table 49. The additional optional strategies may be implemented based on a variety of triggers, such as progress made towards numeric goals. Strategies numbered 1-13 in Table 49 are described in Section 2.4 and further detailed in each RAs JRMP. All other strategies are described in the subsections below.

Through improvements in discharged water quality, identified strategies within the HA are individually and collectively expected to have positive impacts on the receiving waters including the San Elijo Lagoon. In addition to the specific activities related to the San Elijo Lagoon Restoration Project, the RAs' implementation of the identified strategies supports the restoration project's overall objectives.

As the RAs implement strategies and analyze data, it is expected that these strategies and schedules may change through an iterative and adaptive management process. The adaptive management process is presented in Section 2.5.

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<sup>22</sup> Core programs address the requirements of Permit Provisions E.2 through E.7, and their inclusion in the Water Quality Improvement Plan is discussed in Permit Section B.3.b.(1)(a). The requirements applicable to additional, "optional" strategies are discussed in Permit Provision B.3.b.(1)(b).

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Table 49: Escondido Creek HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Condition								Target Temporal Benefit		Implementation Schedule								
		City of Encinitas	City of Escondido	City of Solana Beach	City of San Marcos	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Condition	Dry Weather Condition	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)
PLANNED JURISDICTIONAL STRATEGIES (INCLUDES CORE JURISDICTIONAL PROGRAM, PERMIT SECTIONS E.2-E.7, AND PLANNED OPTIONAL STRATEGIES. PERMIT SECTION B.3.b. (1) (b)))																																	
1	Administrative BMPs	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Investigations	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	Development and Redevelopment Requirements	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide						•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4	Construction Site Inspections	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide				•						•					•	•		•	•	•	•	•	•	•	•	•	•
5	Existing Development Facilities, Areas and Activities Inspections	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•		•			•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
6	MS4 Inspections/Cleaning	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide								•	•	•		•	•		•	•		•	•	•	•	•	•	•	•	•	•
7	Street Sweeping	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide							•		•	•	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•
8	General Education and Outreach	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•			•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
9	Employee Training <sup>2</sup> /Focused Training	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•						•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•
10	Enforcement	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
11	Partnership Program(s)	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
12	Program for Retrofitting Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
13	Program for Stream, Channel and/or Habitat Restoration in Areas of Existing Development	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
14	San Elijo JPA Dry Weather Diversion <sup>3</sup>	San Elijo JPA Outfall	-	-	-	-					•			•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•
15	Plastic Bag Ban <sup>3</sup>	HA Wide	-	HA Wide	-	-				•	•				•	•			•				•	•	•	•	•	•	•	•	•	•	•
16	Rehabilitation of the Olivenhain Trunk Sewer Line <sup>3</sup>	Along San Elijo Lagoon and Escondido Creek	-	-	-	-	•				•				•	•	•	•	•	•		•	•	•		•		•	•	•	•	•	•
17	Dry Weather Flow Abatement Program	Cardiff Channel	-	-	-	-		•		•				•	•	•	•	•	•	•		•	•		•			•	•	•	•	•	•
18	Low Impact Development Residential Retrofit Outreach and Incentive Program <sup>3</sup>	Cardiff Channel	-	-	-	-				•					•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•



Table 49: Escondido Creek HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Condition								Target Temporal Benefit		Implementation Schedule										
		City of Encinitas	City of Escondido	City of Solana Beach	City of San Marcos	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Condition	Dry Weather Condition	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)		
19	Property-Based/Patrol Inspections	-	ESC 113, ESC 128 and ESC 134	HA Wide	-	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•		
20	Storm Drain Videos	-	ESC 113, ESC 128 and ESC 134	HA Wide	-	-							•	•	•		•	•	•					•	•			•	•						
21	Irrigation Runoff Reduction Program	-	HA Wide	HA Wide	-	HA Wide	•	•		•	•			•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•		
22	Enhanced FOG Inspection Program	-	HA Wide	-	-	-		•						•	•		•	•	•	•				•	•	•			•	•	•	•	•	•	
23	North Cedros Storm Water Treatment Unit <sup>3</sup>	-	-	North Cedros	-	-				•			•	•	•	•	•	•	•	•				•	•			•	•	•	•	•	•	•	
24	Santa Rosita and Santa Florencia Slope Drainage Collection <sup>3</sup>	-	-	Santa Street HOAs	-	-				•			•	•	•	•	•	•	•	•				•	•			•	•	•	•	•	•	•	
25	Restoration of Spruce Street Channel (Escondido Creek Restoration Project)		ESC 134							•	•		•	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•	•	•	•	
26	Enhanced Education Program	-	-	-	-	HA Wide	•	•	•	•	•	•		•	•	•	•	•	•		•	•	•	•	•			•	•						
27	BMP Manual Training - External	-	-	-	-	HA Wide						•		•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
28	Promote Incentive Programs: Rain Barrel, Live Turf Replacement & Outdoor Water Efficiency <sup>3</sup>	-	HA Wide	-	-	HA Wide	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
ADDITIONAL OPTIONAL STRATEGIES (PERMIT SECTION B.3.b. (1) (b)) (more information on these strategies and criteria for initiating them can be found in Section 3.5.5.2.2)																																			
29	Enhanced Low Impact Development Residential Retrofit Outreach and Incentive Program	Cardiff Channel	-	-	-	-	•			•	•		•	•		•		•	•		•	•		•		Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
30	San Elijo Lagoon Restoration Support	Cardiff Channel & San Elijo JPA Outfall Areas	-	-	-	-						•			•		•	•		•	•			•		Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
31	Implement Sustainable Landscapes Program	-	-	-	-	HA Wide		•	•	•	•	•			•		•	•		•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
32	Implement a program to remove invasive non-native plants	-	-	-	-	HA Wide		•				•			•		•	•		•	•	•		•		Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									
33	Expanded Polystyrene Ban	HA Wide	-	-	-	-				•	•			•	•		•	•		•	•		•	•		Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)									

Table 49: Escondido Creek HA Strategies

Water Quality Improvement Plan Strategies		Jurisdiction/Area					Target Sources								Target Pollutant, Stressor, or Condition								Target Temporal Benefit		Implementation Schedule									
		City of Encinitas	City of Escondido	City of Solana Beach	City of San Marcos	County of San Diego	Municipal Fixed Facilities	Industrial and Commercial Facilities/Owners	Construction Sites and Personnel	Residential	General Public	Land Development & Redevelopment	Roads, Streets, Highways and Parking Facilities	MS4	Bacteria/Pathogens	Trash	Heavy Metals	Nutrients	Toxicity	Oil and Grease	Riparian Habitat	Sediment	Pesticides	Wet Weather Condition	Dry Weather Condition	Continuous Implementation	Previous Fiscal Year(s)	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Future Fiscal Year(s)	
34	Implementation of Offsite Alternative Compliance Program	HA Wide	HA Wide	HA Wide	HA Wide	HA Wide		•			•	•		•	•		•	•	•			•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								
35	Implement Structural or Retrofit BMPs to Address Flow and/or Pollutant Issues	-	-	HA Wide	HA Wide	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								
36	Support Partnerships with Social Service Providers to Provide Sanitation & Trash Management for Persons Experiencing Homelessness	Cardiff Channel & San Elijo JPA Outfall Areas	-	HA Wide	-	-					•		•	•	•			•	•	•		•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								
37	Assessment of agricultural operations within City jurisdiction and active engagement with growers as needed to attain water quality objectives	-	HA Wide	-	-	-						•						•	•		•	•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								
38	Evaluate additional green infrastructure opportunities, including green streets, and implement as needed to achieve final goals.	-	HA Wide	-	-	-				•		•	•	•				•				•	•	•	•	Based on appropriate criteria for initiating (See Section 3.5.5.2.2 for information)								
WATERSHED MANAGEMENT AREA STRATEGIES (PERMIT SECTION B.3.b. (2))																																		
39	Integrated Regional Watershed Management(IRWM)	WMA wide	WMA wide	WMA wide	WMA wide	WMA wide	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Based on appropriate criteria for initiating							
40	Sustainable Landscape Incentive Program	WMA wide	WMA wide	WMA wide	WMA wide	WMA wide	•	•		•				•				•	•			•	•	•	•	Based on appropriate criteria for initiating								

1 Optional Strategies. Note that where optional strategies are listed under the Planned Jurisdictional Strategies category, RAs have committed to implementing them, so no additional detail on circumstances that would trigger those optional strategies is necessary.

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### 3.6.4.1 Geographic Characteristics and Prioritization

Concentrating program efforts in specific geographic areas to address known or suspected sources of discharges and pollutants is expected to improve the effectiveness of the strategies and activities.

Based on the RAs review of the characteristics of the Escondido Creek HA, several areas of focus were selected for concentrated program efforts. Focus areas were selected based on identified sources that are associated with contributing to the HPWQC, outfall information collected by RAs, and other identified characteristics that support the areas as priority areas. These focus areas include the City of Solana Beach within the Escondido Creek HA, two drainage basins in the City of Encinitas (Cardiff Channel Drainage Area and San Elijo JPA Outfall at Cardiff) and three basins in the City of Escondido (ESC 113, ESC 128, and ESC 134). The goals and strategies for these focus areas are summarized below.

#### 3.6.4.1.1 Solana Beach Drainage Area

The San Elijo Lagoon is on the northern border of the City of Solana Beach. The City of Solana Beach has identified the entire portion of the City that discharges towards the lagoon as its focus area, shown in Figure 44. The area is primarily single-family residential land use with some commercial areas, multi-family residential, an elementary school, a portion of a golf course, common areas and recreational park areas that include landscaping and turf, which are known types of contributors to non-storm water discharge resulting in pollutant loading. The majority of this basin was developed prior to implementation of the City of Solana Beach SUSMP, therefore relatively few treatment control BMPs have been established.

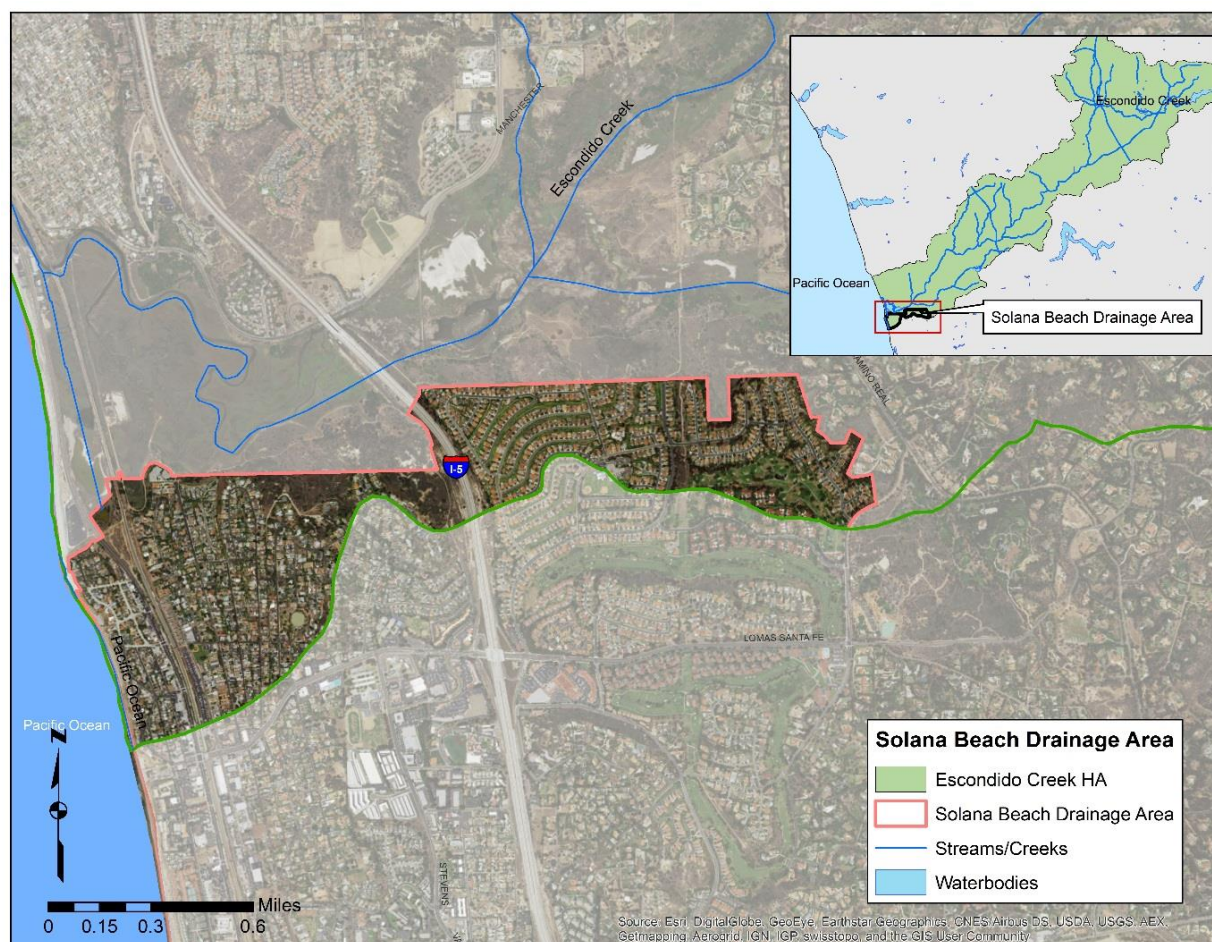


Figure 44: Solana Beach Drainage Area/Focus Area



### 3.6.4.1.2 City of Encinitas – Cardiff Channel and San Elijo JPA Outfall

The San Elijo Lagoon is on the southern border of the City of Encinitas. Encinitas has identified two basins that discharge to the lagoon in which the City will focus its program strategies. These two focus areas are the Cardiff Channel Drainage Area (Figure 45) and San Elijo Joint Powers Authority (JPA) Outfall at Cardiff Drainage Area (Figure 46).

The two focus areas include a mixture of single-family residential, commercial and multi-family land uses. Homes, commercial buildings, apartment complexes, nurseries, common areas and recreational park areas that include landscaping and turf are present in these focus areas and are known types of contributors to non-storm water discharge and associated pollutants. The majority of these basins were developed prior to implementation of the Encinitas's SUSMP, and therefore relatively few treatment control BMPs are in place.

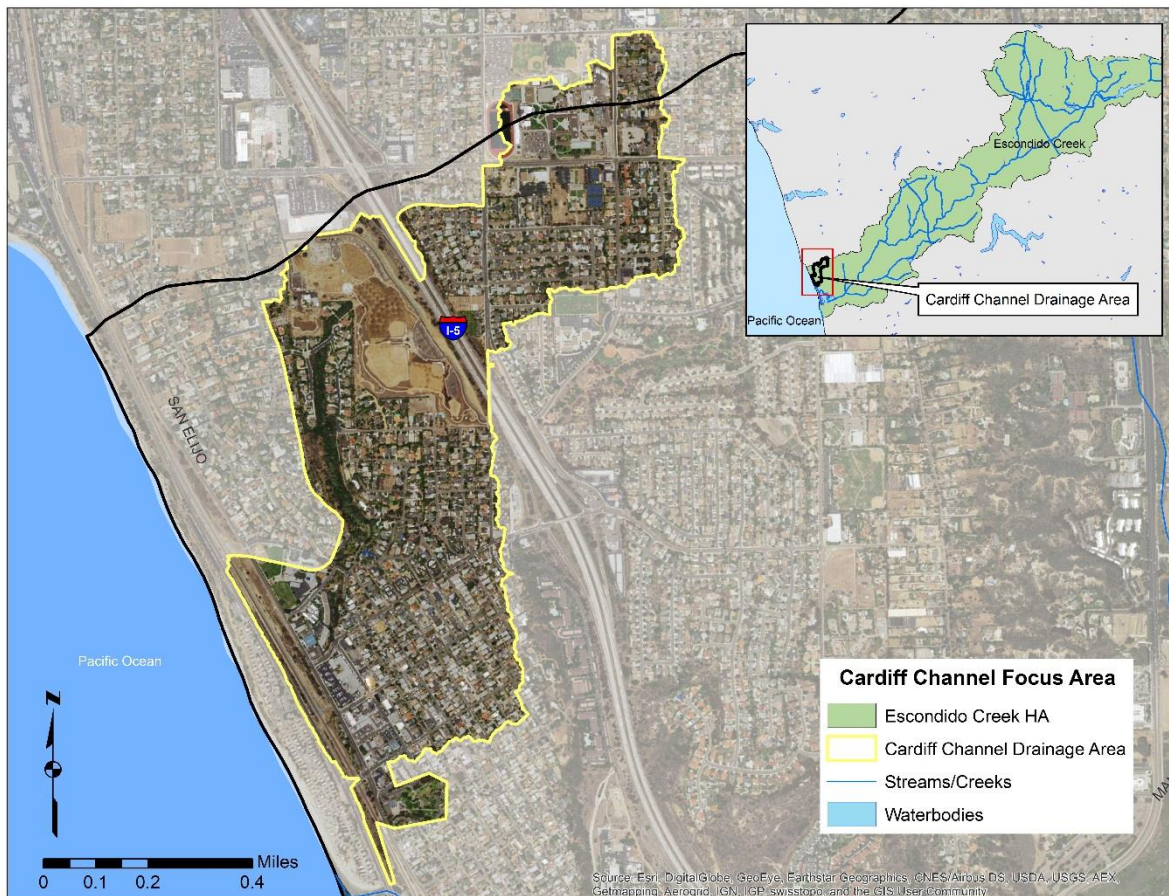


Figure 45: Cardiff Channel Drainage Area, City of Encinitas Focus Area



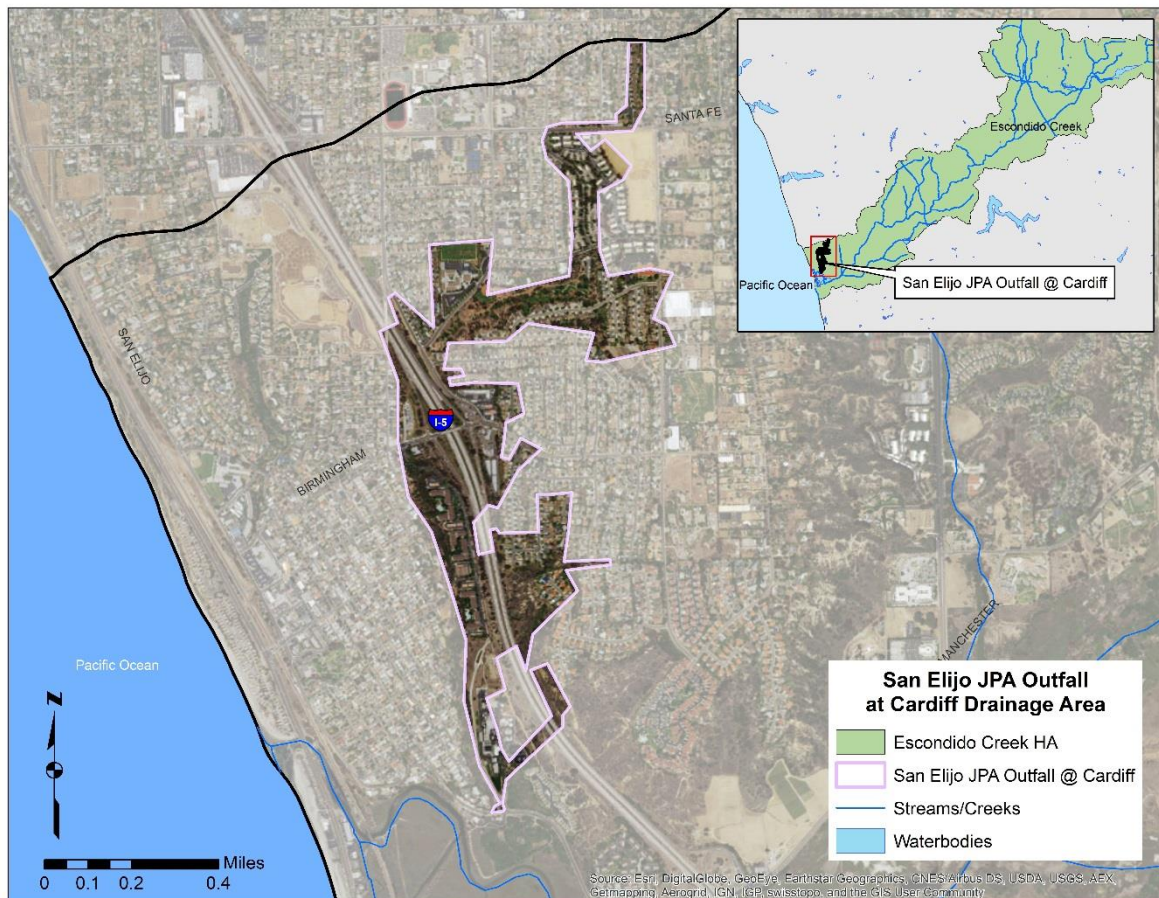


Figure 46: San Elijo JPA Outfall at Cardiff Drainage Area, City of Encinitas Focus Area

#### 3.6.4.1.3 ESC 113, ESC 128, and ESC 134

The Escondido Creek HA extends through a significant portion of the City of Escondido (Escondido) near the upper portion of the HA. Escondido has identified three areas in the HA to focus their program strategies. The basins have a mixture of single-family residential, commercial, industrial and multi-family land uses and includes homes, commercial buildings, mobile home parks, nurseries, and common areas that include landscaping and turf, which are known types of contributors to non-storm water discharge and associated pollutants.

The rationale for selecting these three focus areas is based on several key factors distinguishing them from other drainage basins. All three focus areas have:

- 1) Persistently flowing major MS4 outfalls directly into Escondido Creek
- 2) Jurisdictional basis in Escondido, with minimal surface water influence from adjacent jurisdictions
- 3) Sizeable tributary areas
- 4) Recorded historical exceedances of water quality conditions
- 5) Residential Areas which will be addressed by the City of Escondido's residential JRMP component

Escondido will implement special strategies in three focus areas, identified as ESC 113, ESC 128, and ESC 134 – shown in Figure 47, Figure 48, and Figure 49.



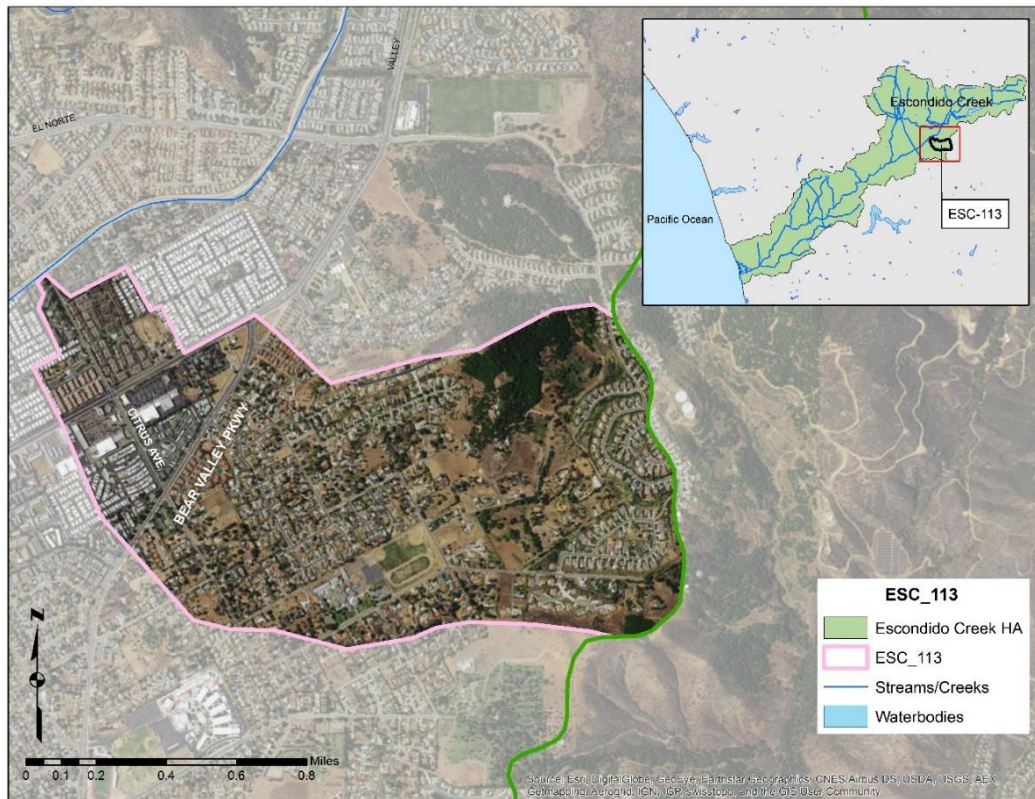


Figure 47: Escondido ESC 113 Focus Area

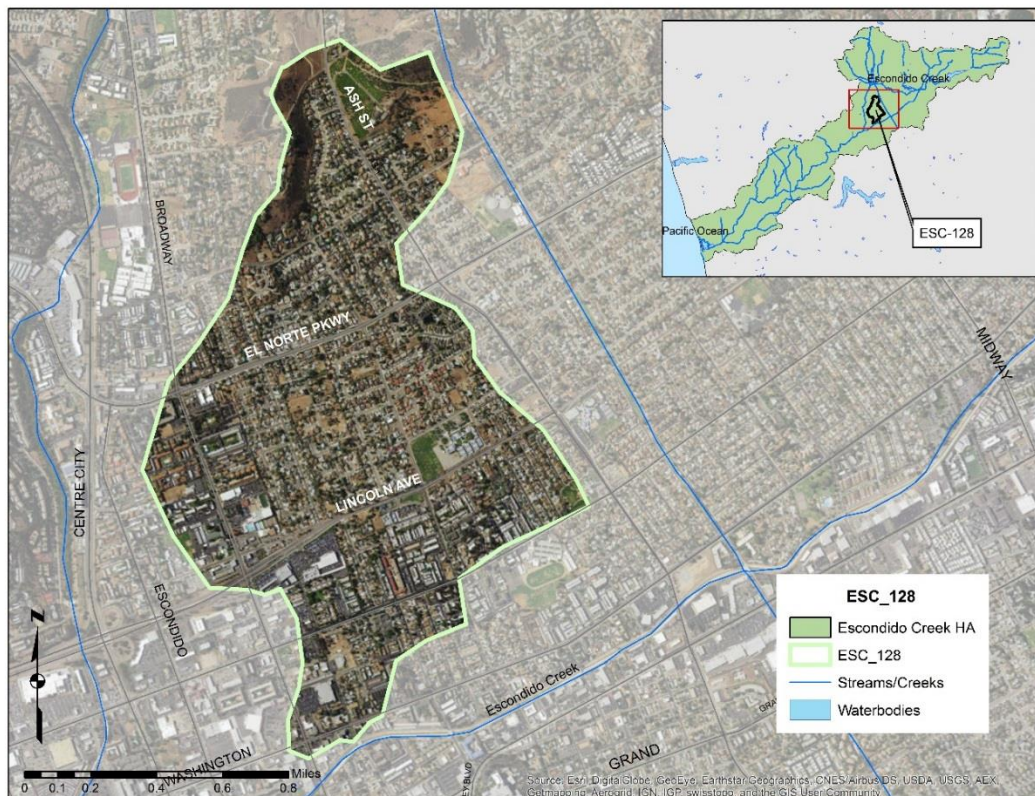
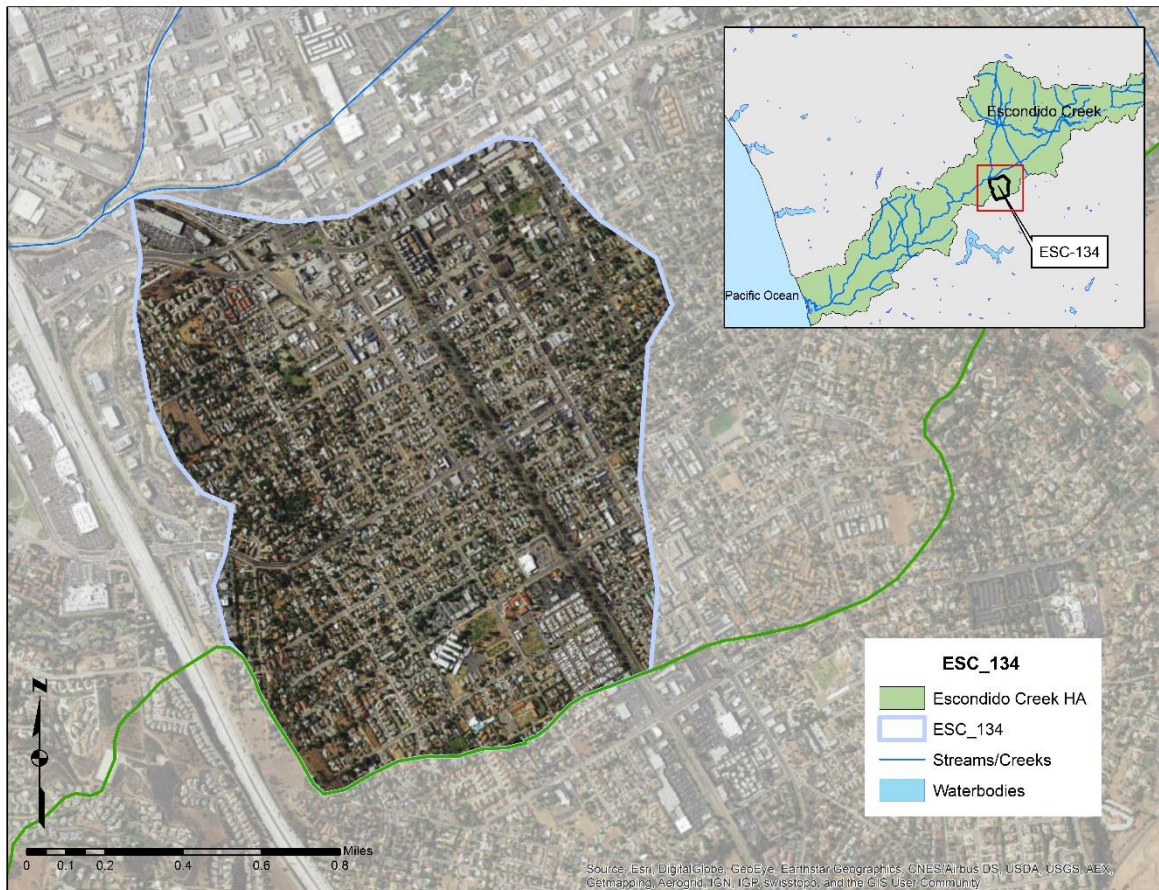


Figure 48: Escondido ESC 128 Focus Area





**Figure 49: Escondido ESC 134 Focus Area**

#### 3.6.4.2 Escondido Creek HA Strategy Descriptions

The following sections describe the planned jurisdictional and planned optional strategies, additional optional strategies, and watershed management area strategies to be implemented within the Escondido Creek HA.

##### 3.6.4.2.1 Planned Jurisdictional and Optional Strategies

The planned jurisdictional and planned optional strategies to be implemented within the Escondido Creek HA are described below. These strategies include the core jurisdictional program elements (Permit Provisions, E.2. through E.7.)<sup>23</sup> described in Section 2.4.2 of this WQIP, enhancements of the core jurisdictional program elements, and optional strategies that are planned for implementation. Optional strategies that are already planned for implementation do not include additional detail on circumstances that would trigger implementation or funding and resources.

<sup>23</sup> Core jurisdictional program elements (Strategies 1-13 in Table 4) are described in Section 2.4.2 of this WQIP and are not summarized in this section.

**Strategy 14 (Table 49) - San Elijo JPA Dry Weather Diversion****Jurisdiction/Area for Implementation:** City of Encinitas: San Elijo JPA Outfall

<b>Target Sources:</b> General Public; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

A dry weather diversion was installed at the San Elijo JPA outfall in Cardiff in FY 2012-2013. The diversion redirects dry weather flow that would otherwise discharge from the MS4 to San Elijo Lagoon to the sanitary sewer system. This system eliminates discharges of non-storm water and all pollutants, including bacteria, to San Elijo Lagoon from the San Elijo JPA Outfall Drainage Area. Significant resources, including maintenance staff time and the cost of treating diverted water at the wastewater treatment plan, are necessary to continue operating the dry weather diversion. This diversion is being operated and maintained by the San Elijo JPA, which includes the City of Encinitas. Resources to continue operation of the diversion have been allocated.

**Strategy 15 (Table 49) - Plastic Bag Ban****Jurisdiction/Area for Implementation:** City of Encinitas: HA Wide; City of Solana Beach: HA Wide

<b>Target Sources:</b> Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Toxicity	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Encinitas recently passed an ordinance banning distribution of single use plastic bags throughout the City. The ordinance is a true source control approach to eliminating trash; true source control eliminates the initial introduction of pollutants to the environment and is therefore widely recognized as among the most effective and efficient methods to reduce pollution. The ban applies to large retailers, grocery stores, drug stores, convenience stores, and mini-markets in spring 2015 and to farmer's markets and all other retailers in fall 2015. Removing trash from the MS4 is expected to reduce trash and associated pollutants by preventing the introduction of food wastes and similar materials sometimes found in plastic bags. The ban, along with the proposed ban on expanded polystyrene products (see Section 3.6.5.2.2), is also expected to help the City comply with the upcoming requirements of the State Trash Amendments. The requirements of the ordinance will be implemented on an ongoing basis.

The City of Solana Beach introduced and adopted a similar ordinance on May 9, 2012. In addition, the ban on expanded polystyrene products was also adopted as per Ordinance 466 on 10/28/2015.

**Strategy 16 (Table 49) - Rehabilitation of the Olivenhain Trunk Sewer Line****Jurisdiction/Area for Implementation:** City of Encinitas: Along San Elijo Lagoon and Escondido Creek

<b>Target Sources:</b> Municipal Fixed Facilities; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The Olivenhain Trunk Sewer line is predominately located within the boundaries of the San Elijo Lagoon; as such, the safe operation and maintenance of the facility is of high importance. The trunk line was constructed 39 years ago, and due to its age, all of the manholes along the line are in need of either rehabilitation or complete replacement. Current access to the system is limited and in order to efficiently maintain the facility access must be improved. Finally, the upstream portion of the trunk sewer will be upsized from the existing 8-inch line to a new 12-inch line to accommodate flows. This capital project reduces the potential for bacteria discharges from sanitary sewer infiltration to the MS4 and from sanitary sewer overflows. The estimated cost of the project is \$3,800,000, and the necessary resources have been allocated. Design is mostly complete, and resource agency permitting is in progress. The project will likely go out to bid in March 2016. This date is contingent on approval of resource agency permits (USACOE 404, Regional Board 401, and CDFW 1602). Construction will likely start 6 months after going out to bid, and construction may take 1-2 years.

**Strategy 17 (Table 49) - Dry Weather Flow Abatement Program****Jurisdiction/Area for Implementation:** City of Encinitas: Cardiff Channel

<b>Target Sources:</b> Industrial and Commercial Facilities; Residential; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of Encinitas monitors outfalls for flow, receives and responds to public reports of discharges, and inspects businesses, construction sites, and residential areas to identify discharges. The City will prioritize inspections of businesses and residential areas in the Cardiff Channel drainage area such that they are completed soon after the approval of the WQIP. This will help Encinitas identify sources of discharges, and in turn take actions to eliminate them, earlier within the Permit cycle. Because persistent flow has been observed at the Cardiff Channel outfall, the City will also complete a more in-depth investigation to identify sources of non-storm water flow to the outfall. The study will likely include historical research and chemical testing to differentiate among different flow source types, including anthropogenic and non-anthropogenic sources. Upstream investigations will also be completed as necessary to identify source locations, as needed. Identified sources will be required to be eliminated, in accordance with the procedures in the City's Enforcement Response Plan.

While the City already has an IDDE program through which it identifies and eliminates prohibited discharges, the City will make the Cardiff focus area a high priority and concentrate its source identification and elimination resources within the Cardiff focus area. Once sources have been identified, the City will work with responsible parties to eliminate the discharges, in accordance with the City's Enforcement Response Plan.

**Strategy 18 (Table 49) - Low Impact Development Residential Retrofit Outreach and Incentive Program****Jurisdiction/Area for Implementation:** City of Encinitas: Cardiff Channel

<b>Target Sources:</b> Residential	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Encinitas will expand its implementation of the LID outreach and incentive program originally developed for the Cottonwood Creek Basin to the Cardiff Channel focus area. The program educates and motivates homeowners to reduce irrigation runoff and/or wet weather flows by implementing the following structural improvements to their properties:

- Landscape water conservation practices (drip irrigation, turf reduction, etc.)
- Small-scale LID features (downspout disconnects, bioretention "rain gardens," etc.).

Existing water conservation incentives will be promoted through the program through partnerships with the San Dieguito Water District and the Olivenhain Municipal Water District. Existing incentives include rebates for turf removal and installation of drip irrigation, both of which reduce overall water use and irrigation runoff. Free water use evaluations are also available in addition to rebates to promote water conservation. The program also includes partnering with a resident within the target area to implement small-scale LID features on their property to serve as a demonstration project. The City will also organize and put on, along with the resident, a tour of the retrofitted property for community members, during which they can get ideas for retrofits at their own properties, learn how to implement retrofits, and ask questions of experts. This program may be expanded through preparing more in-depth how-to guides for residents or allocating additional resources for incentives, as discussed in Section 3.5.5.2.2.



**Strategy 19 (Table 49) - Perform Property-Based Inspections/Patrol****Jurisdiction/Area for Implementation:** City of Escondido: ESC 113, ESC 128, and ESC 134; City of Solana Beach: HA Wide**Target Sources:**

Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Streets and Parking Facilities; MS4

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides

**Temporal Benefit:**☒ Wet Weather Conditions  
☒ Dry Weather Conditions**Strategy Description:**

The objective of this program is to reduce discharges to the MS4 and provide inspection of existing development in a more cost efficient and effective manner. The inspections are expected to result in the elimination of dry weather flows, but will also affect the wet weather loading potential and provide opportunities for identification of potential retrofit projects. Features include:

- Developing patrol and inspection protocols
- Developing and conducting staff training
- Conducting property-based/patrol inspections
  - Performing patrols/inspections once per year in these focus areas
  - Performing onsite patrols/inspections of each property in the focus area
  - Identification of active dry weather discharges and evidence of historical discharges
  - Identification of pollutant generating activities and areas that may contribute wet weather storm water pollutant loading
- Performing follow-up with property owner/manager on identified issues to resolve discharges and/or potential pollutant discharges.

**Strategy 20 (Table 49) - Storm Drain Videos****Jurisdiction/Area for Implementation:** City of Escondido: ESC 113, ESC 128, and ESC 134; City of Solana Beach: HA Wide**Target Sources:**

MS4

**Target Stressors/Pollutants/Conditions:**

Trash, Bacteria, Nutrients

**Temporal Benefit:**☒ Wet Weather Conditions  
☒ Dry Weather Conditions**Strategy Description:**

On an as-needed basis, Escondido and Solana Beach will use downhole video technology to assess where dry weather flows enter the storm drain system. The objective of the use of video is to identify groundwater intrusion and to facilitate a better understanding of the City of Escondido's and City of Solana Beaches MS4 network through collaboration with the sewer and water utilities field staff.

**Strategy 21 (Table 49) - Irrigation Runoff Reduction Program (IRRP)****Jurisdiction/Area for Implementation:** City of Escondido: HA Wide; City of Solana Beach: HA Wide; County of San Diego: HA Wide**Target Sources:**

Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; MS4

**Target Stressors/Pollutants/Conditions:**

Bacteria/Pathogens; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides

**Temporal Benefit:**☐ Wet Weather Conditions  
☒ Dry Weather Conditions**Strategy Description:**

The objective of the Irrigation Runoff Reduction Program (IRRP) is to eliminate or reduce dry weather flow contributions, concurrent with the final goals, coming from irrigation runoff, regardless of the time of day the discharges occur. Reducing or eliminating runoff from irrigation will reduce non-storm water flows thereby reducing bacterial contributions (as well as other pollutants) in both dry weather and wet weather scenarios. An irrigation runoff program is expected to target such pollutants as heavy metals, nutrients, oil and grease, sediment, and pesticides, in addition to bacteria. Core elements include:

- Developing municipal codes that prohibit irrigation runoff
  - Developing educational materials and outreach program specific towards irrigation runoff
  - Assessing dry weather flows at outfall(s)
  - Identifying key times to perform site observations

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- Perform site observations to identify sources of irrigation runoff
- Collaboration with the City of Escondido Public Works Department to address municipal property irrigation systems
- Initiating contact and correspondence with property managers/owners
- Periodically assessing flows
- Optionally developing and implementing an incentive program to encourage the elimination of irrigation runoff

**Strategy 22 (Table 49) - Enhanced FOG Inspection Program**

**Jurisdiction/Area for Implementation:** City of Escondido: HA Wide

<b>Target Sources:</b> Industrial and Commercial Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Oil and Grease	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Escondido's FOG inspection program addresses businesses with grease traps or separators, including restaurants, automotive repair facilities, and others. As operator of a Publicly Owned Treatment Works (POTW), Escondido implements an enhanced inspection schedule city-wide, inspecting restaurants on average more than once each year. This enhanced inspection program mitigates the potential causes for sewer overflows, and also address storm water BMPs.

**Strategy 23 (Table 49) - North Cedros Storm Water Treatment Unit**

**Jurisdiction/Area for Implementation:** City of Solana Beach: North Cedros

<b>Target Sources:</b> Industrial and Commercial Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

In 2002, the City of Solana Beach approved plans for improvements along North Cedros Avenue, north of Cliff Street. These improvements included installation of a storm water treatment CDS unit. This unit was installed in 2004 and has been in operation ever since. The CDS unit screens, separates, and traps debris in runoff from a 42" pipe.

**Strategy 24 (Table 49) - Santa Rosita and Santa Florencia Slope Drainage Collection**

**Jurisdiction/Area for Implementation:** City of Solana Beach: Santa Street HOAs

<b>Target Sources:</b> Residential; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

In January 2014, the City of Solana Beach approved plans for a slope drain diversion structure that diverts water collected in subdrains along the slopes of Santa Rosita and diverts it in the sewer manhole located at the intersection of Santa Rosita and Santa Florencia. This project was constructed in August 2014 and helps prevent dry weather flows caused from over irrigation from entering the MS4.

**Strategy 25 (Table 49) - Restoration of Spruce Street Channel (Escondido Creek Restoration Project)****Jurisdiction/Area for Implementation:** City of Escondido: ESC 134

<b>Target Sources:</b> Residential; General Public; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Heavy Metals; Nutrients; Oil and Grease; Toxicity; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The Spruce Street Channel is an approximately 2,600 linear foot tributary to the Escondido Creek with rare portions of unlined channel. Currently the unlined portions of the channel (1,400 linear feet) support non-native vegetation which is unsightly and contributes to the potential for flooding. Other portions of the infrastructure have accumulations of sediment. The goal of the project is to restore this channel to ensure proper function, eliminate vector control and flooding issues and to create riparian/wetland habitat. BMPs will be installed to allow the removal of pollutants before they enter the restored area and improvements will be made to allow for ease of maintenance. It is anticipated that with the restoration of this channel that there will be multiple water quality benefits for the watershed.

**Strategy 26 (Table 49) - Enhanced Education Program****Jurisdiction/Area for Implementation:** County of San Diego: HA Wide; City of Escondido: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City of Escondido provides an enhanced education program through a dedicated staff member who does outreach on storm water and water conservation issues at schools (“The Water Lady”) Presentations are provided to elementary-aged school children on topics consistent with the Common Core Standards. The City supplements this with the provision of “Splash Lab” visits, field trips and presentations to Junior High and High school classes as requested. Outreach to adults includes the provision of landscaping workshops and online resources for residents interested in converting their gardens to California-friendly gardens. An annual landscaping competition is organized to acknowledge the accomplishments of those who have installed California-friendly gardens and to raise awareness of the overall issue. City staff also provide education at community events, at neighborhood group meetings, special interest groups (i.e., Kiwanis) and community education events (e.g., library seminars). Education is also provided as needed in response to observations made during residential management area inspections and will be tailored specifically to the need (in person conversation, provision of brochures, presentations to community groups and HOAs). These in-person interactions are supplemented by our City webpage and Facebook page.

Priority pollutant specific education and outreach program to be conducted in the focus area for residents and commercial facilities related to riparian habitat degradation and other priority pollutants. The materials will focus on results obtained through property-based inspections and address priority pollutant sources.

- Identification of pollutant generating activities and areas that may contribute wet weather storm water pollutant loading (e.g., concentrated pet waste in common areas)

Developing and implementing a training/seminar for property managers and others that have direct responsibility for common areas within HOAs and commercial properties. Educational materials and information will be developed and provided to the managers for them to distribute to their residents and tenants.

**Strategy 27 (Table 49) - BMP Manual Training****Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The BMP Manual for new and redevelopment will be updated in FY16 and training/outreach will be provided to County staff followed by the development industry. One-time land development workshops will be held to educate the development community on updated requirements, particularly as they pertain to priority sources of bacteria and other pollutants, such as residential areas and commercial areas including nurseries/greenhouses and eating/drinking establishments.

**Strategy 28 (Table 49) - Promote Incentive Programs for BMP Retrofits****Jurisdiction/Area for Implementation:** County of San Diego: HA Wide; City of Escondido: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Residential; General Public; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Beginning in FY15-16 and continuing on an ongoing basis, the County will promote incentives for water conservation and landscape retrofits through partner agencies (including MWD, local water districts, and the SDCWA) such as turf replacement, sprinkler head nozzle replacements, smart irrigation controllers, rain barrels, etc. Incentive programs may be developed for this program if funding is available. BMP retrofits will target sources of dry weather flows that can mobilize pollutants that impact riparian habitat, particularly associated with residential areas as well as roads, streets, and parking.

The City of Escondido is already implementing similar programs through partnership with the MWD and SDCWA and will continue to do so

**3.6.4.2.2 Escondido Creek HA Optional Strategies**

This section describes the additional optional strategies that will be triggered for implementation in response to specific conditions that are described in accordance with the requirements of Permit Provision B.3.b(1)(b).

**Strategy 29 (Table 49) - Enhanced Low Impact Development Residential Retrofit Outreach and Incentive Program****Jurisdiction/Area for Implementation:** City of Encinitas: Cardiff Channel

<b>Target Sources:</b> Municipal Fixed Facilities; Residential; General Public; Streets and Parking Facilities Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The City will fund an LID retrofit incentive program and develop more detailed how-to guidance materials for residents. Incentives would likely be rebates for implementing LID features like downspout disconnections or rain barrels.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Non-storm water source investigations have identified significant anthropogenic surface runoff contributions to Cardiff Channel, 2) initial implementation of the LID retrofit outreach and incentive program in the Cardiff Channel focus area indicates significant community interest, 3) interim numeric goals are not met, 4) funding has been approved for the incentive program, 5) staff resources are available to develop how-to guidance and to develop and administer an incentive program.

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**Resources Required to Implement Strategy:**

Resources necessary include the following:

1) Staff resources to develop more detailed how-to guidance material, 2) funding for incentives (approximately \$3,000 to \$20,000, depending on the scope of the program), and 3) staff resources to administer the incentive program (amount of staff time depends on the scope of the program).

**Timeline to Secure Resources for Optional Strategy:**

The program could likely begin within approximately 1 year of being triggered.

**Strategy 30 (Table 49) - San Elijo Lagoon Restoration Support**

**Jurisdiction/Area for Implementation:** City of Encinitas: Cardiff Channel

<b>Target Sources:</b> Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Riparian Habitat	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

The planned restoration project will directly improve beneficial uses in the impacted receiving waters. Encinitas will support the multi-agency efforts to restore San Elijo Lagoon in coming years. Part of the participation is expected to come through supporting public infrastructure improvements, as needed. Collaborating agencies include Caltrans and the San Elijo Lagoon Conservancy.

**Circumstances to Trigger the Implementation of the Strategy:**

The following all will need to be satisfied to trigger the strategy:

1) Environmental approvals and regulatory permits for the lagoon restoration have been secured, 2) Caltrans appropriates funding for the main lagoon restoration project, 3) Encinitas City Council approves funding for design and construction of City infrastructure improvements necessary to support the project, 4) City staff resources are available to oversee infrastructure improvement design and construction, and 5) any additional environmental approvals and regulatory permits necessary to allow Encinitas to pursue infrastructure improvements are secured

**Resources Required to Implement Strategy:**

The resources necessary will depend on the type and scope of infrastructure improvements needed, which in turn depend on which lagoon restoration alternative is selected. Resources necessary will include the following: 1) design and permitting support (typically over \$100,000), 2) construction costs (to be determined based on project size and type), and 3) staff resources to oversee design and construction

**Timeline to Secure Resources for Optional Strategy:**

An approximate timeline, starting from the date triggered, is provided below:

- Design and permitting (1-3 years)
- Bid and award process (6 months)
- Construction (1-4 years)

**Strategy 31 (Table 49) - Implement a Sustainable Landscapes Program**

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Riparian Habitat, Sediment, Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Implement Sustainable Landscapes Program to encourage landscape retrofits.

**Circumstances to Trigger the Implementation of the Strategy:**

Implementation of this strategy will be triggered if (1) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (2) all of the necessary resources have been secured.

**Resources Required to Implement Strategy:**

- Staff Resources
- Grant Funding
- Incentive Items
- Partnerships



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**Timeline to Secure Resources for Optional Strategy:**

Implementation in FY 2016-17, and continuous until grant funding and incentives are depleted; future implementation schedule 1 year once triggered. Addresses pollutants from residential areas, nurseries and greenhouses.

**Strategy 32 (Table 49) - Implement a program to remove invasive non-native plants**

**Jurisdiction/Area for Implementation:** County of San Diego: HA Wide

<b>Target Sources:</b> Industrial and Commercial Facilities; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Implement a program to remove invasive non-native plants (i.e. Arundo) upstream areas rivers or tributaries.

**Circumstances to Trigger the Implementation of the Strategy:**

Implementation of this strategy will be triggered if (1) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (2) community support and partnerships established; and (3) it has been determined that invasive plants have been found to have an impact on water quality; and (4) all of the necessary resources have been secured.

**Resources Required to Implement Strategy:**

- Staff resources
- Grant funding or alternative source
- Contractor funding
- Partnerships

**Timeline to Secure Resources for Optional Strategy:**

Implementation 3 – 5 years once triggered. Addresses pollutants from open space areas

**Strategy 33 (Table 49) - Expanded Polystyrene Ban**

**Jurisdiction/Area for Implementation:** City of Encinitas: HA Wide

<b>Target Sources:</b> Residential; General Public	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Riparian Habitat;	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

Polystyrene products are commonly referred to as Styrofoam. Removing trash from the MS4 through this ban is expected to reduce pollutants by preventing the introduction of food wastes and similar materials sometimes found in polystyrene products. The requirements of the ordinance will be implemented on an ongoing basis.

**Circumstances to Trigger the Implementation of the Strategy:**

The proposed ban requires passing an ordinance. The City has begun the public process necessary to pass the ordinance, but implementation of the ban is contingent on ordinance adoption by City Council.

**Resources Required to Implement Strategy:**

Staff resources to support the ordinance development and adoption process

**Timeline to Secure Resources for Optional Strategy:**

Sufficient staff resources have been acquired, and the process of pursuing an expanded polystyrene ban has begun. Depending on the results of the public process, it may take 1-2 years to complete the ordinance development and approval process.

### Strategy 34 (Table 49) - Implement Offsite Alternative Compliance Program

**Jurisdiction/Area for Implementation:** City of Encinitas: HA Wide; City of Escondido: HA Wide; City of Solana Beach: HA Wide; City of San Marcos: HA Wide; County of San Diego: HA Wide

<b>Target Sources:</b> Industrial and Commercial Facilities; Construction Sites; Residential; Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Nutrients; Toxicity; Oil and Grease; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Refer to JRMP Chapter 4. The City of Escondido will develop a draft water quality credit system option consistent with Provision E.3(d) to place water quality improvement projects throughout Escondido, including Focus Areas

The City of San Marcos will develop an alternative compliance program utilizing the guidelines established in the accepted Water Quality Equivalency Guidance for Region 9 and will incorporate potential candidate project areas identified in the Watershed Management Area Analysis. The City of San Marcos is also exploring the development of a possible In-Lieu Fee program.

The County is currently implementing Phase 1 of the Offsite Alternative Compliance Program as defined in the WPO, Section 67.811(b)(4)(c). This phase allows for an Applicant-Implemented Offsite Alternative Compliance Project (ACP) project. This program became effective on February 26, 2016 and allows for a developer to wholly or partially satisfy their on-site storm water compliance obligations through the implementation of an ACP that is owned or constructed by the PDP project applicant.

#### Circumstances to Trigger the Implementation of the Strategy:

The trigger for implementation of Alternative Compliance Program is: when resources have been secured and leadership consensus and community support has been achieved

#### Resources Required to Implement Strategy:

The resources required to complete this optional strategy include: staff time allocation, administrative plan and procedures for the program consistent with regional standards, and approval by the City Council and the RWQCB. Furthermore, candidate projects must be identified, permitted, and funded. The cost for developing and implementing this program during the permit cycle is unknown, but funds have been secured for FY2016 for program development.

#### Timeline to Secure Resources for Optional Strategy:

This optional strategy needs resources that are independent of each other, e.g., water quality equivalency system and funding of staff to implement the program. It is anticipated that it would take two to five complete fiscal year cycles to obtain the necessary resources to initiate this strategy.

### Strategy 35 (Table 49) - Implement Structural or Retrofit BMPs to Address Flow or Pollutant Issues

**Jurisdiction/Area for Implementation:** City of Solana Beach: HA Wide; City of San Marcos: HA Wide

<b>Target Sources:</b> Municipal Fixed Facilities; Industrial and Commercial Facilities; Construction Sites; Residential; General Public; Land Development & Redevelopment; Streets and Parking Facilities; MS4	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Heavy Metals; Nutrients; Toxicity; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Implement structural (engineered) BMPs or retrofitting existing structural BMPs to address flow and/or pollutant issues

#### Circumstances to Trigger the Implementation of the Strategy:

Interim goals are not met; progress towards numeric goals is not adequate; Staff resources are identified and secured; Adaptive management informs the Cities to implement.

#### Resources Required to Implement Strategy:

Voter/council approval of projects; staffing necessary to implement the planning, design and construction of such projects; project funding; required permits from state and federal regulatory agencies.

#### Timeline to Secure Resources for Optional Strategy:

If implemented, structural BMPs will be integrated into the City's Capital Improvement Program for planning, design and construction. Many of the City's typical capital projects are funded through dedicated sources, e.g., transportation tax dollars. Structural BMPs will have to identify alternative sources of funding, e.g., grants or partnerships, and therefore may take longer to process than typical capital projects. It is estimated that structural BMP projects may take five years to secure the resources necessary to initiate each project within the strategy.

### Strategy 36 (Table 49) - Support Partnerships with Social Service Providers to Provide Sanitation & Trash Management for Persons Experiencing Homelessness

**Jurisdiction/Area for Implementation:** City of Encinitas: Cardiff Channel & San Elijo JPA Outfall Areas; City of Solana Beach: HA Wide

<b>Target Sources:</b> General Public; Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Trash; Oil and Grease; Riparian Habitat; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

Support a non-profit or consortium to provide sanitation services associated with hygiene as well as trash management for persons experiencing homelessness. Rented or purchased shower/sanitary trailers providing mobile showers may be organized at specifically scheduled locations and times. This provision has been proposed as a method for preventing surface water usage for sanitation and bathing, as well as opportunity for outreach and referral by social service agencies.

#### Circumstances to Trigger the Implementation of the Strategy:

The following all will need to be satisfied to trigger the strategy:

1) Homeless communities are identified as sources of pollutants impacting riparian habitat to the City's MS4 2) funding to address MS4 discharges is identified and secured through a public process, 3) staff resources necessary to coordinate with a regional group are identified and secured, and 4) partners have been identified and formal MOUs have been developed. Projected funding needs may be met through grant funding, support from community groups or other institutions, or the City's General Fund.

#### Resources Required to Implement Strategy:

The anticipated cost to implement the strategy is approximately \$10,000 to \$50,000 per year.

#### Timeline to Secure Resources for Optional Strategy:

Once initiated, program development is expected to take at least one year, with implementation following development on a continuous basis as long as funding is available. All resources from the General Fund are secured on an annual basis and are contingent upon annual budget approval by City Council.

### Strategy 37 (Table 49) - Assessment of agricultural operations within City jurisdiction and active engagement with growers as needed to attain water quality objectives

**Jurisdiction/Area for Implementation:** City of Escondido: ESC 113, ESC 128, ESC 134

<b>Target Sources:</b> Land Development & Redevelopment	<b>Target Stressors/Pollutants/Conditions:</b> Nutrients; Toxicity; Riparian Habitat	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input checked="" type="checkbox"/> Dry Weather Conditions
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#### Strategy Description:

This will include: Prepare and maintain a figure of the locations of agricultural operations in Escondido; identifying agricultural land close to receiving waters and/or MS4 system; conducting a site reconnaissance to assess if discharges are likely to occur; developing a series of follow-up actions specific to those risks. Sites of concern will be referred to the Irrigated Lands Group at the RWQCB.

#### Circumstances to Trigger the Implementation of the Strategy:

If agricultural properties within the City of Escondido are determined to be a potential source of pollutants impacting riparian habitat, and interim load reduction goals are not met, this strategy will be triggered

#### Resources Required to Implement Strategy:

The resources required for this strategy include: staff time and budget to administer the program, administrative procedures developed and enacted, and (potentially) outreach materials developed directed at this specific audience. The estimated cost of implementation of this strategy is unknown at this time

#### Timeline to Secure Resources for Optional Strategy:

This strategy would be ongoing and require approximately 6-12 months to develop the program.

### Strategy 38 (Table 49) - Evaluate additional green infrastructure opportunities, including green streets, and implement as needed to achieve final goals

**Jurisdiction/Area for Implementation:** City of Escondido: HA Wide

<b>Target Sources:</b> Residential, Land Development & Redevelopment, Streets and Parking Facilities	<b>Target Stressors/Pollutants/Conditions:</b> Bacteria/Pathogens; Nutrients; Sediment; Pesticides	<b>Temporal Benefit:</b> <input checked="" type="checkbox"/> Wet Weather Conditions <input type="checkbox"/> Dry Weather Conditions
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**Strategy Description:**

This will include: identification of projects that could be expanded to include BMPs to treat runoff in existing development.

**Circumstances to Trigger the Implementation of the Strategy:**

Project opportunities, feasibility of BMP implementation, funding for construction and maintenance, relevant approvals (City Council, Planning Commission) attained.

**Resources Required to Implement Strategy:**

The resources required for this strategy include: staff time and budget to administer the program, project opportunities, funding for construction and maintenance. The estimated cost of implementation of this strategy is unknown at this time

**Timeline to Secure Resources for Optional Strategy:**

This strategy would be ongoing and require approximately 6-12 months to develop the program.

#### 3.6.4.2.3 Watershed Management Area Strategies

Watershed Management Area Strategies to be implemented within the Carlsbad WMA are described in Section 2.4.4.

#### 3.6.5 Escondido Creek HA Monitoring and Assessment

The RAs will conduct the following monitoring in the Escondido Creek HA including the collective watershed-wide monitoring activities described in Section 2.6:

- Progress Toward Interim and Final Goals
- Long-Term Receiving Water Monitoring (as described in Section 2.6)
- Dry Weather Special Study
- MS4 Outfall Monitoring (as described in Section 2.6)
- JRMP Implementation (as described in Section 2.6)
- Regulations and Policy (as described in Section 2.6)

#### Progress toward Interim and Final Goals

The progress toward meeting the interim and final goals will be monitored and assessed through the restoration project implementation and milestones. There will be water quality monitoring that is associated with the restoration project which is summarized below.

#### Riparian Habitat Degradation – Spruce Street Project

Monitoring for the Spruce Street Improvement Project has not commenced. However, as part of its MS4 Monitoring Plan and the Special Study on Dry Weather Flows and bacteria that was conducted in September-October 2015, the City of Escondido included outfall monitoring, which will provide preliminary information on wet and dry weather flows and concentrations of constituents of concern. The data will be used to help develop a baseline for the Spruce Street Improvement Project. Updates on monitoring associated with the Spruce Street Project will be included in WQIP Annual Reports.

#### Escondido Creek HA Special Study

A Dry Weather Special Study will be implemented to characterize temporal flow and applicable pollutant patterns at identified persistently flowing major MS4 outfalls during dry weather conditions. The special study is related to non-stormwater flows and associated pollutants, which can contribute to the identified HPWQC and will be implemented in priority areas within respective jurisdictions.

The Dry Weather Special Study will address the following questions:

- What is the baseline flow at the specified major MS4 outfalls during dry weather conditions?
- What are the temporal flow patterns at specified major MS4 outfalls during dry weather conditions?
- Are dry weather flows at the specified major MS4 outfalls contributing applicable pollutants to the receiving water(s)?
- What are the temporal patterns of applicable pollutant concentrations at specified major MS4 outfalls?

The study will:

- Address data gaps related to temporal flow and applicable pollutants at identified persistently flowing major MS4 outfalls during dry weather conditions.
- Allow the RAs to understand potential sources of flow and therefore more effectively target and control sources contributing to the Highest Priority Water Quality Condition, and
- Establish a baseline for flow during dry weather conditions with which to measure subsequent flow reductions.

The RAs will conduct the special study within the Escondido Creek HA to assess flows and applicable pollutants at both an outfall and watershed-wide level. The special study will include the following elements:

- Collect continuous flow monitoring data at specified major outfalls using automated flow meter and data logger.
- Conduct monitoring events at identified major outfalls specified in Table 50
- Collect grab samples and analyze for applicable pollutants to identify critical conditions for identified pollutants.
- Record visual observations consistent with the transitional outfall monitoring program.
- Collect in-situ physical parameters for pH, temperature, and specific conductivity.
- Perform site observations at key times within the catchment areas and record all observed areas and/or sources with non-storm water flow, and
- Track flow patterns to sources for abatement or further investigation.

**Table 50: Dry Weather Data Collection by Jurisdiction for the Escondido Creek HA**

Item	City of Solana Beach	City of San Marcos	City of Escondido
Number of Focus Areas in Escondido Creek HA	1	1	3
Number of Outfalls for Continuous Flow Monitoring	2	1	3
Minimum Time for Continuous Flow Monitoring	2 weeks	2 weeks	2 weeks
Minimum Number of Applicable Pollutant Samples at Each Outfall Where Flow is Measured	4	4	4
Total Number of Applicable Pollutant Samples	8	4	12

#### Assessment

The Escondido Creek HA RAs will perform assessments of the following elements:

- Progress Toward Interim and Final Goals
- Dry Weather Special Study

As new data and information becomes available, the RAs will perform an integrated assessment of the findings from the identified focused areas. The integrated assessment will evaluate the JRMP program



implementation in relationship to the findings of the assessment for progress toward interim and final goals. This integrated assessment would be performed at this scale to identify relationships between the strategies implemented in the focus areas and outcomes related to the interim and final goals. The outcomes of this assessment could be used to help determine the effectiveness and efficiency of the identified strategies implemented. In some instances, the data and information collected can also provide a baseline and each subsequent assessment year will provide effectiveness information to assist in adaptively managing the programs.

Longer-term assessments will be performed at the WMA scale as appropriate data and information is collected and assessed.

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